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MODERN METALS

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(see page 32)

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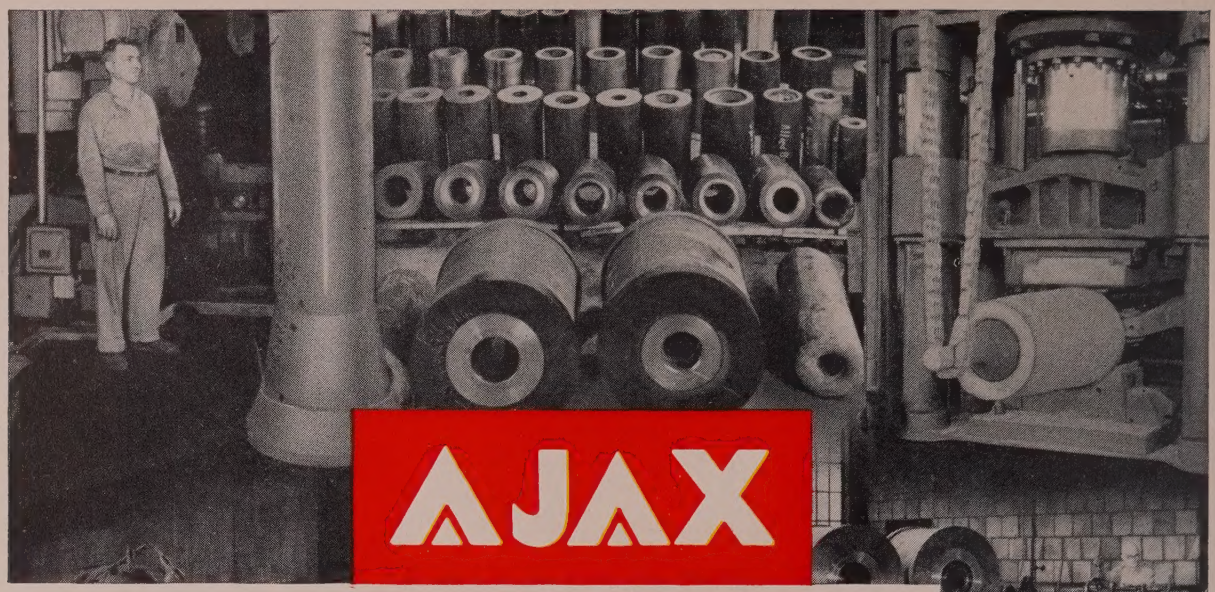

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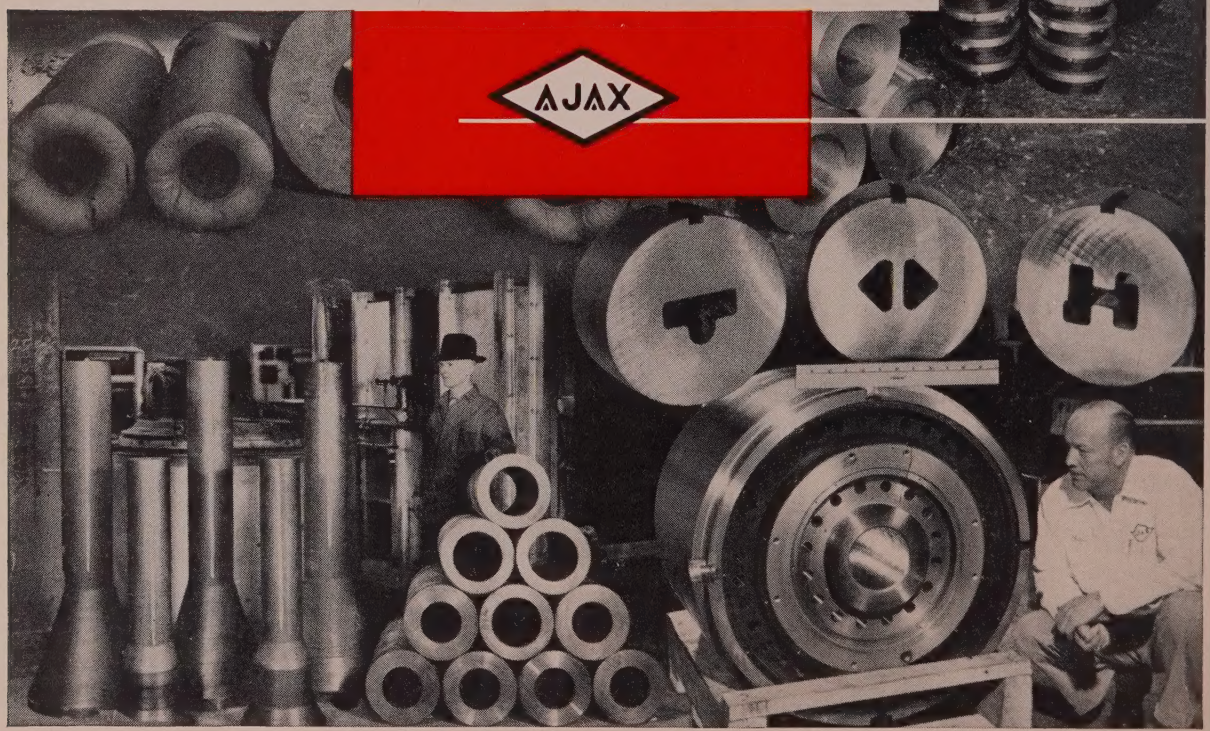

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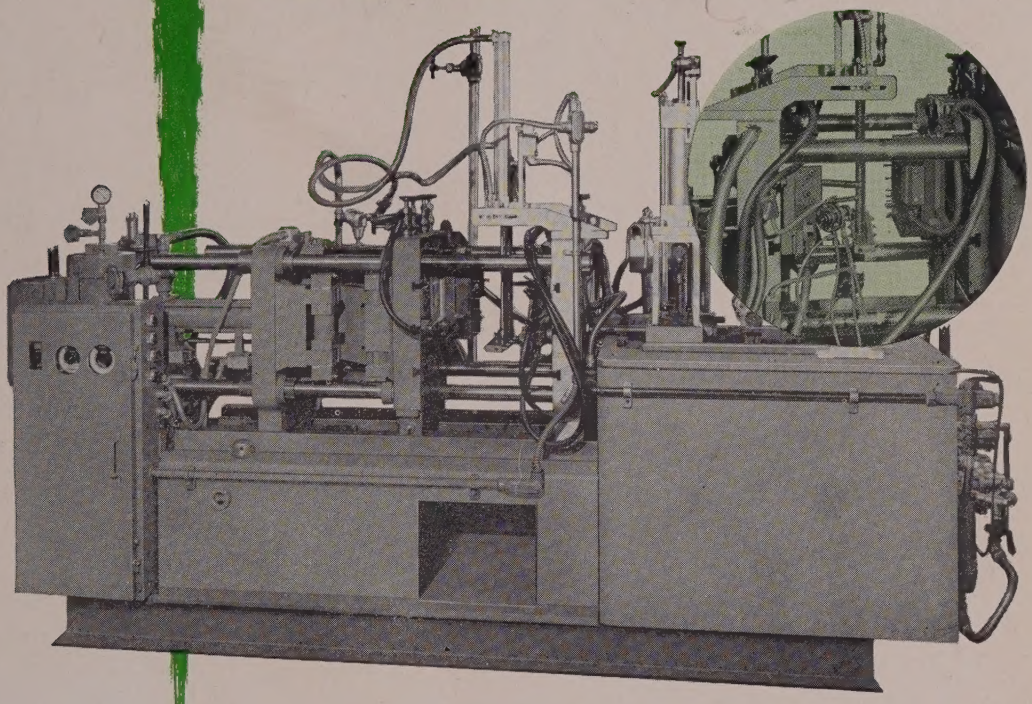

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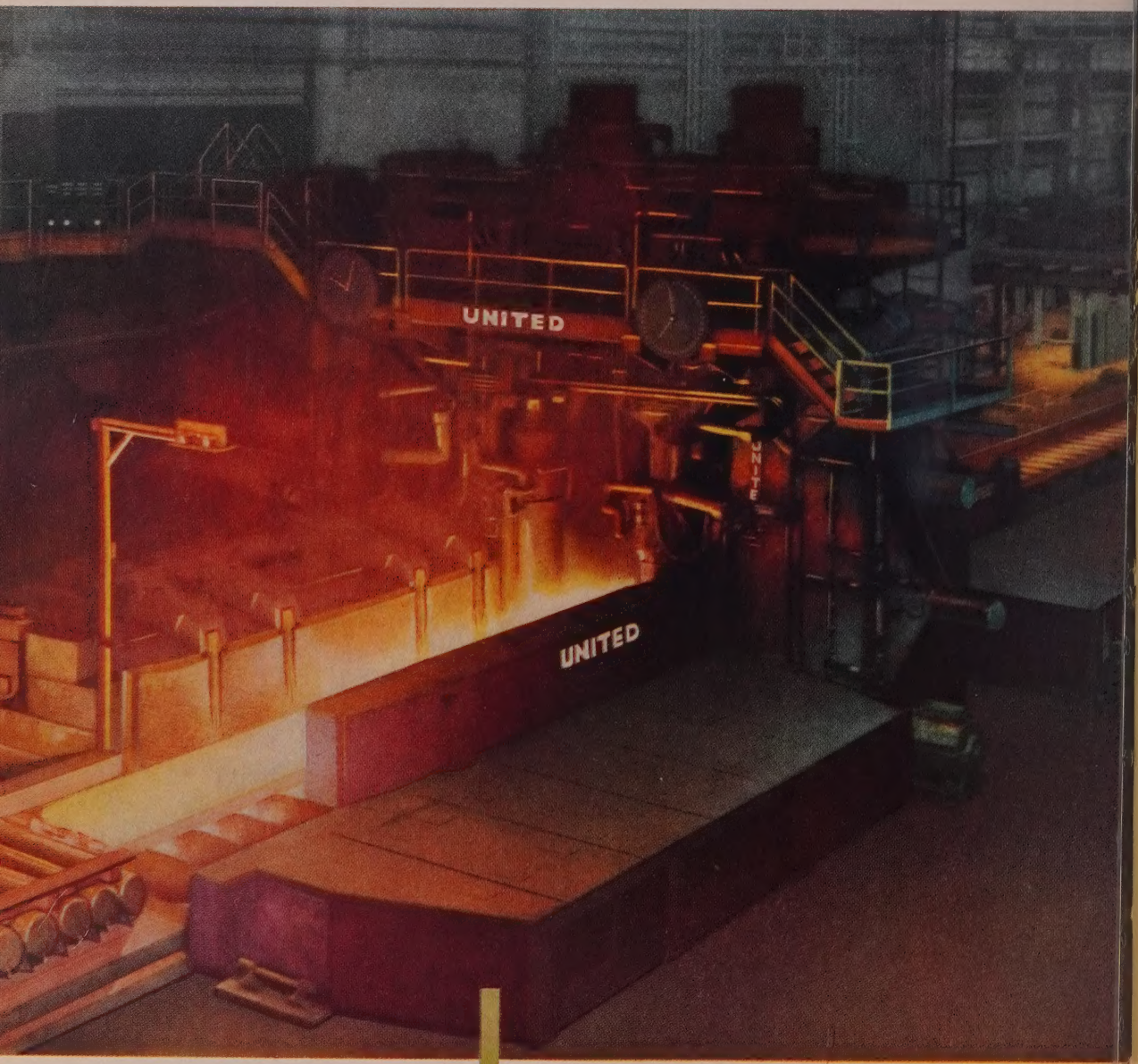

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Welding Aluminum

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Aluminum is one of the most weldable of all metals. In most cases, it can be welded or brazed easily, with the same equipment used for joining other metals—and, with a new technique, soldering now is also practical.

Special Considerations

Like any other metal, aluminum has its own characteristics which are important to the welder: First, pure aluminum melts at 1220° F, while some alloys have constituents that melt at 900° F. Second, aluminum does not change color when heated, so the operator must watch for the "wet" surface appearance to indicate melting. Oxidation is more of a factor in aluminum welding than with other metals. A tough, transparent oxide film forms on all exposed aluminum surfaces. This film must be removed before or during welding.

Welding Aluminum Alloys

Basically, two factors will determine whether an aluminum alloy can be welded by a particular process: Copper content and magnesium content. High copper content (3–4% or more) makes weld metal brittle, weakening adjoining metal when fusion welded, unless it is heat treated after welding. These alloys are best joined by resistance welding.

High magnesium content produces heavier oxide coatings, so these alloys are not best for brazing or soldering where high oxide formation is a critical factor.

Inert Gas Welding Aluminum

The most popular methods of welding aluminum are the inert gas-shielded tungsten arc (TIG) and the inert gas-shielded metal arc (MIG) processes.

Inert gas welding is suitable for all alloys and thicknesses of aluminum. TIG is recommended for thicknesses up to ¼", with MIG for thicker sections. Spot or seam welding is used mostly on sheet.

Arc Welding Aluminum

Arc welding has some advantages over other methods of welding aluminum: its ease of edge preparation, speed, reduced distortion, and elimination of flux in certain methods.

Aluminum may be arc welded by any of four different processes: metal-arc, carbon-arc, atomic-hydrogen, and inert-gas-shielded arc welding (the most successful method).

Resistance Spot and Seam Welding Aluminum

Aluminum alloys have a higher electrical conductivity than most resistance weldable materials. Thus, higher-capacity welders must be used. The low melting point of aluminum requires precise control of the energy input to the weld, and provision should be made in the welding setup to compensate for shrinkage on cooling. For welds of maximum strength and uniformity, material must be carefully cleaned, oxide coatings removed.

Brazing Aluminum

Aluminum's natural oxide coating makes the use of a brazing flux necessary. As the filler metal is an aluminum alloy, it matches the aluminum parts closely in appearance. The joint is strong, and has high corrosion-resistance. Little finishing is needed after brazing.

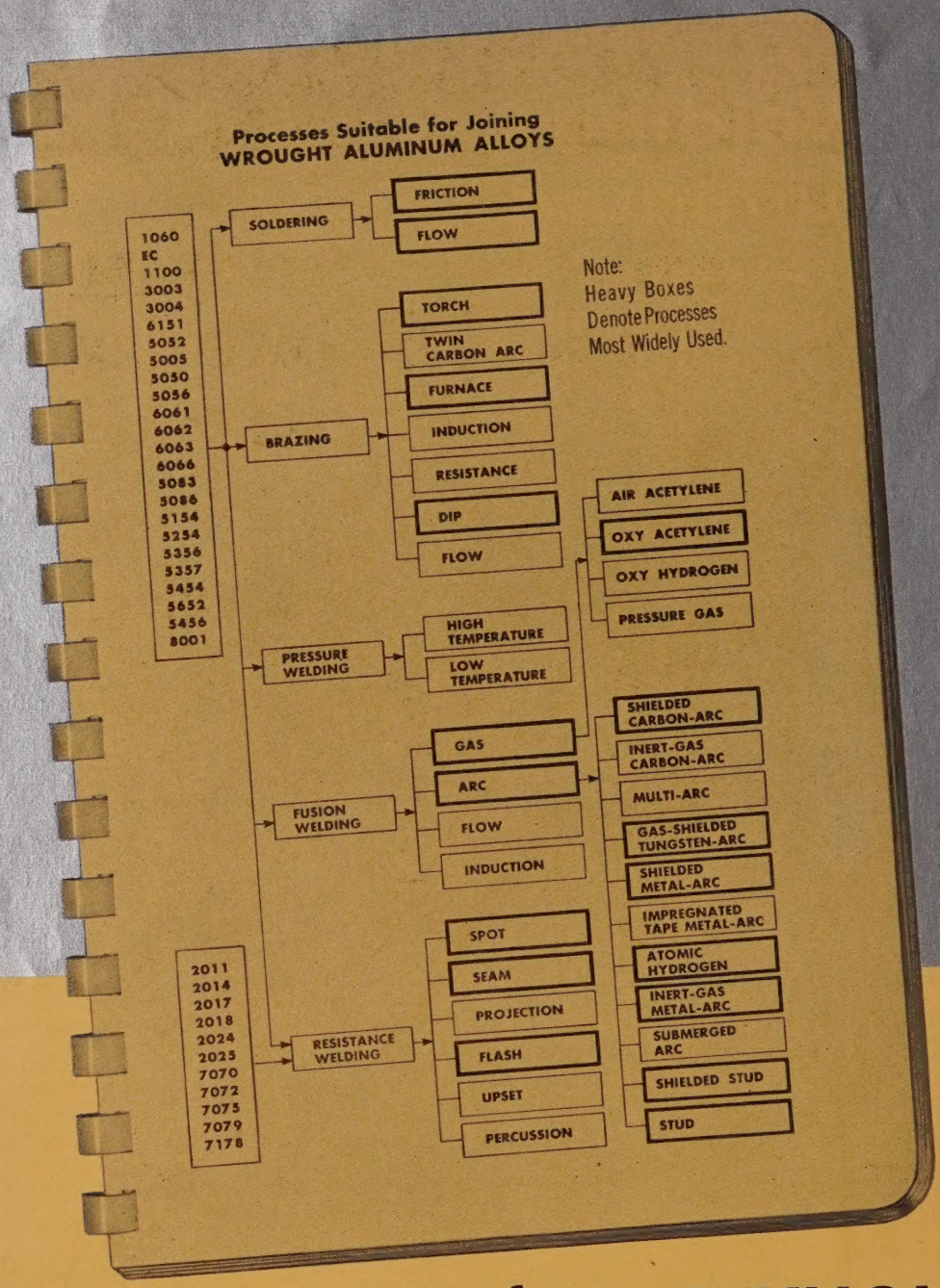
Brazing is well suited to mass production methods, and complicated assemblies are easily joined. Wrought alloys commonly used in brazing are 1100, 3003, 3004, 5050, 5052 and 6061. Also used are aluminum brazing sheets, made in three different compositions, and coated on one or both sides with a brazing alloy to eliminate the need for filler metal. These sheets make multiple and inaccessible joints easy to produce.

Soldering Aluminum

New developments have made the soldering of aluminum more practical for production than ever before. Three basic methods are used: (1) Flow or Reaction Soldering, which uses a flux to remove oxide from the aluminum surface and to promote the tinning action. (2) Friction Soldering uses a solder that retains full strength to the melting point. The solder stick, rubbing against the work, breaks through the oxide film to promote tinning. (3) Glass Fiber Brush Soldering, the newest and easiest method, uses glass fibers to break through the oxide coating beneath a layer of molten solder, tinning the joint surfaces.

For more complete information on the techniques and equipment for welding, brazing or soldering aluminum, including variations of the methods mentioned here, write for Reynolds technical handbooks, "Welding Aluminum", "Brazing Aluminum" or "Soldering Aluminum." Single copies available free when requested on business letterhead. For personal assistance on special problems, and information on the new "brush soldering" technique, call your nearby Reynolds office or your Reynolds Distributor, listed under "Aluminum", in the classified phone book, or write *Reynolds Metals Company, P.O. Box 2346-KL, Richmond 18, Virginia.*

REYNOLDS ALUMINUM



WELDING DATA from REYNOLDS

. . . and more information available on welding and joining aluminum!

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Call the nearest Reynolds office or your Reynolds Distributor. They're listed under "Aluminum" in your classified telephone directory. Or write on business letterhead to *Reynolds Metals Company, P.O. Box 2346-KL, Richmond 18, Virginia.*

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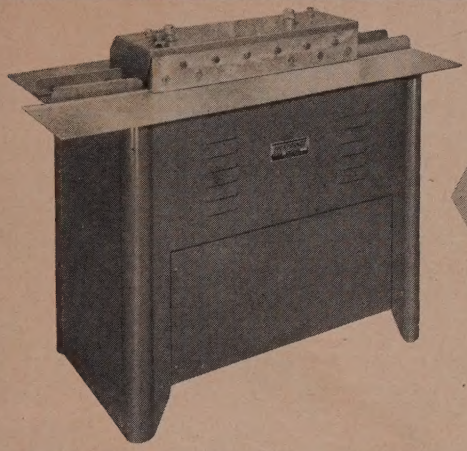

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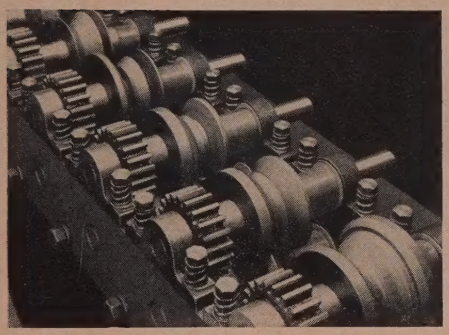
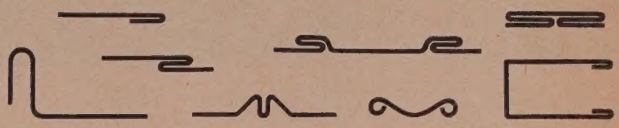


2 CUSTOM ROLLS TO YOUR SPECIFICATIONS



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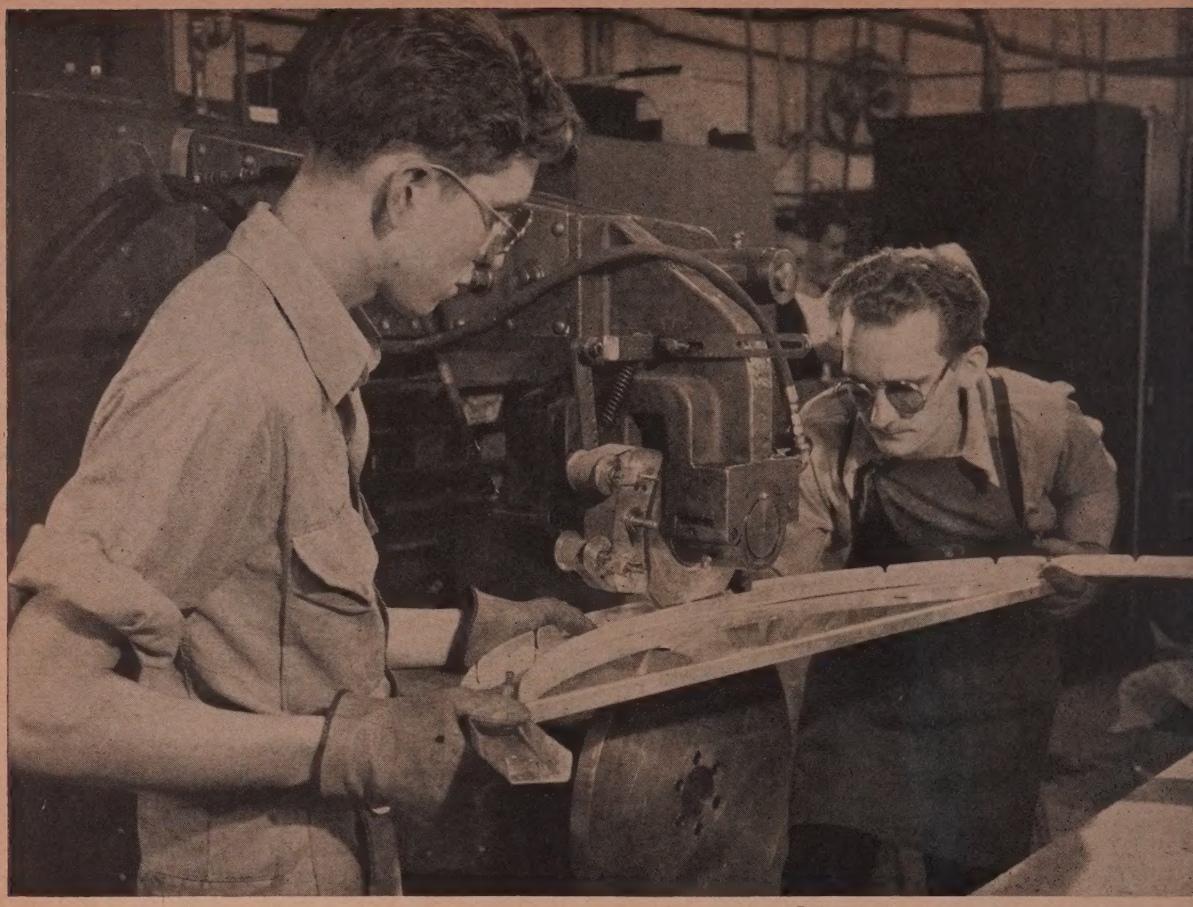

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MODERN METALS

Read in companies that produce, fabricate and cast aluminum, magnesium and titanium, and firms that use these metals in manufacturing end products.

N THE COVER: Aluminum is hard to eat in applications such as stair and balny railings when the manufacturer develos an ingenious erection system, creates a easing design, and tops it off with painsking workmanship. A case in point is the aircase shown on the cover. The article arting on page 32 details the railing work one by Aluminium S.A. Menziken, Switzerand.

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W. B. GRIFFIN

Modern Metals

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Sign maker finds that longer life, lower upkeep more than make up for higher cost of porcelain-aluminum.

GOOD DESIGN IN RAILINGS ..... M. Spescha **32**
Swiss firm makes good use of aluminum extrusions in its attractive railings for stairs, balustrades.

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How a small custom reroll firm meets big competition by stressing quick service, quality standards.

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Machine attaches spouts to aluminum coffee pots at rate of 300-400 per manhour; eliminates costly grinding and polishing operations.

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GOOD DEGREASER FOR ALUMINUM **56**
With its high boiling point, Perchloroethylene penetrates deeper, lasts longer, reduces staining.

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Magnesium proves ideal for axial flow fans.

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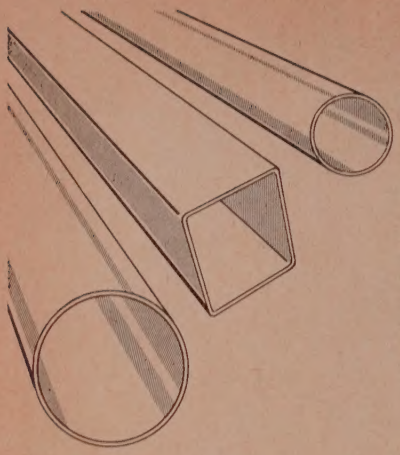

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Letters

MORE FIRMS WANT HARDWARE

Sirs:

On page 12 of the February 1959 issue of your publication there is a letter under the heading "Wanted: Hardware." We also would be interested in receiving information from companies who fabricate hardware for aluminum shower doors and glass sliding doors.

"F"—Rhode Island

Sirs:

"We, too, are interested in "Hardware" as requested by "S" Florida.

"A"—Michigan

MM—The publishing biz is full of surprises. You'd think it would be simple enough to find hardware suppliers. Apparently not, judging from these and other letters from readers. Maybe hardware makers are not getting their message across to their prospects. Who's interested?

MAN WANTS INFO ON SPINNING METALS

Sirs:

We are seeking information concerning the spinning of metals. We are also requesting a free copy of your State-by-State Survey of the Light Metals Industry.

We manufacture residential mail boxes made from brass and steel, and we are interested in going into the manufacture of planters made of brass and aluminum.

We are seeking information on the machinery needed (such as the metal spinning lathes), on the types of tools used in forming the metal to the patterns after they are put on the lathe, and all information on the techniques used in preforming operations.

If you know of some firm doing the spinning of metals in our vicinity, please let us know their address . . .

"D"—Texas

MM—You'll find a detailed, 2-part article on spinning aluminum in the February and March 1957 issues of Modern Metals. It probably contains most of the dope you want. As for the Survey, the second (revised) edition is being printed. We'll send you a copy when it's off the press. Anyone else want one? Fill in the coupon on page 20.

"SHORTCUT TO SHEET"

Sirs:

Will you kindly send eight copies of the March 1959 issue of MODERN METALS. We are interested in the article "Shortcut to Aluminum Sheet," on page 30.

"H" Missouri

MM—This is just one of the flood of requests for copies of the article on Joe Hunter's remarkable continuous casting machine. In case you missed the article, the machine converts molten aluminum directly into quarter-inch thick, 3-foot wide re-roll stock, ready to be cold rolled down to sheet or foil. One casting step replaces all the ingot casting, scalping, preheating, breakdown, and hot rolling operations in a conventional hot line.

Our supply of March issue copies is dwindling fast. The article is being reprinted, however, and if you want a copy send your request to Mr. R. S. Brill, Hunter Engineering Co., 1495 Columbia Ave., Riverside, Calif.

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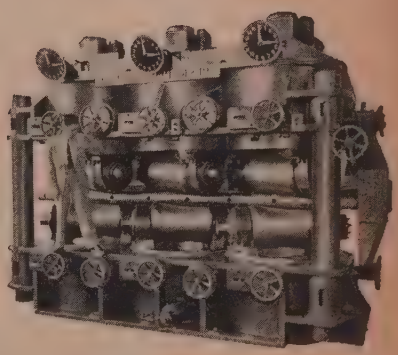

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Gentlemen:

The February issue under "Letters" asks who makes concrete molds.

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"J"—California

MM—Thanks.

WHO MAKES CAST FURNITURE?

Gentlemen:

We are interested in buying cast aluminum furniture and would appreciate the names and addresses of aluminum foundries who manufacture same.

"M"—Florida

MM—We'll be glad to forward any replies from firms that manufacture cast aluminum furniture.

ANYBODY WANT TO SELL HIS BACK ISSUES OF MM?

Gentlemen:

. . . As you know, I want to obtain back issues of MODERN METALS to complete my own set so that I can have a complete set of bound volumes, starting from the first issue. . . . I would be glad to pay for the back copies from anyone who has them.

"H"—California

MM—About two years ago, a reader who was retiring offered to give his complete collection of MODERN METALS to somebody who could really use them. He quickly found a taker. Anybody else want to get rid of his back issues? Here's a chance to convert them into cash.

EXTRUSION PRESS WANTED

Gentlemen:

We are very much interested in obtaining a list of manufacturers of aluminum extrusion presses with the idea of ultimately purchasing same.

Can you supply us with such a list?

"S"—Pennsylvania

MM—Here's a list of the major extrusion press builders:

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Canton, Ohio

Feller Engineering Company
1159 Empire Building
Pittsburgh 22, Pennsylvania

Loewy-Hydropress
Div. Baldwin-Lima-Hamilton
111 Fifth Avenue
New York 3, New York

Sutton Engineering Company
First National Bank Building
Pittsburgh 22, Pennsylvania

Watson-Stillman Press Div.
Farrel-Birmingham Co., Inc.
565 Blossom Road
Rochester 10, N. Y.

Youngstown Foundry & Machine Co.
Reserve Street
Youngstown 2, Ohio

WANTS TITANIUM ROD AND TUBING

Gentlemen: :

Please advise us whom to get in touch with for titanium rod and tubing. Any assistance will be appreciated.

"F"—Florida

MM—Contact Ti-Tan Metal Co., 3125 Madison, S.E., Grand Rapids, Mich.

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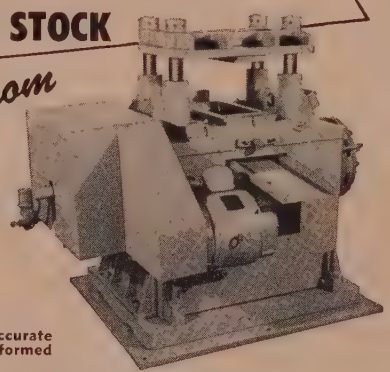

- For rapid and accurate cut-off of roll formed metal shapes.
- Enables use of coil stock in place of cut lengths.
- Operating speed of 300 R.P.M. 4 to 120 ton capacity.
- Flag trip or positive mechanical run-out table to suit your needs. Simplified adjustment of height and lateral requirement.
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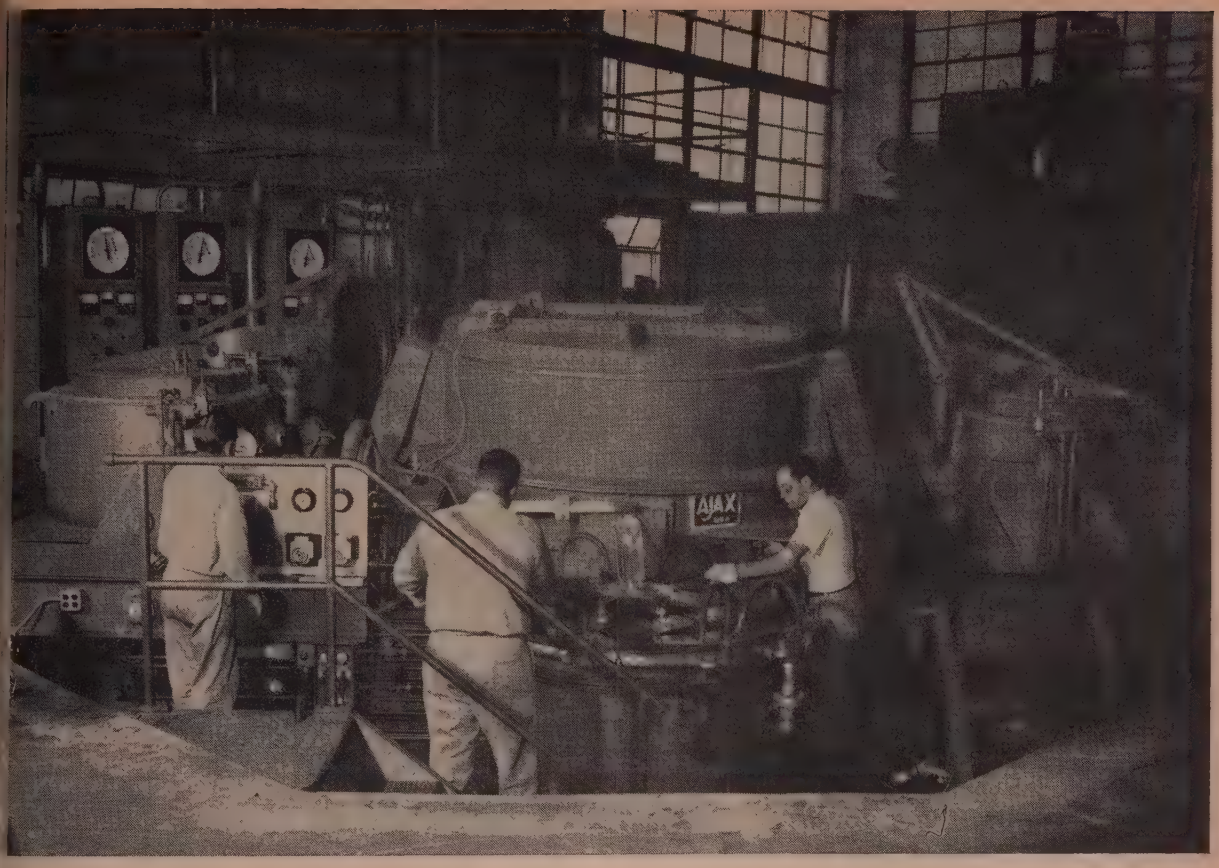
Roll Forming Machines, Flying Cut-Off Presses, Coil Reels, Coil Lifts, Roll Straighteners, Press Feed Lines, Decoiling and Shearing Lines.

Here and There

A Banker Looks At Al. » » Aluminum's imme diate future may be fraught with perplexities, but it long range growth potential remains impressive, ac cording to the March-April issue of "Business in Brief," a service publication put out by The Chase Manhattan Bank. Noting that the industry has been expanding 3½ times as fast as the national economy in the pas 50 years, the bank publication points out that "in the past two years . . . capacity has expanded more rapidly than use." But, it adds, the aluminum industry "has a record of aggressive, and successful, development o new markets." The way Chase sees it, over-supply ha spurred action on four fronts: Accelerated research i capitalizing on the metal's advantages; cooperation with other industries has helped develop new market (aluminum homes, for instance); greater availabilit is transforming operations from a job order to a mass production basis; and prices are becoming com petitive with other materials in more and more uses

It's About Time! » » "We think we have a won derful metal, but our main trouble is that we've neve told anyone what to do with it." This frank statemen is attributed to Isadore Glueck, secretary-manager o the Brass and Bronze Ingot Institute, a group of smelt ers who make copper-base alloys for foundries. Accord ing to an article in the Chicago *Sun-Times,* this indus try's income has fallen behind the growth of the gen eral economy because smelters are too secretive abou technological advances and cost-cutting methods an because over-priced copper has often fallen prey to very aggressive aluminum industry. But (and th seems incredible) perhaps the most important reaso for brass' fall from grace is that the smelters "hav never fully explored the physical properties of the product." But now the industry seems to be wakin up. Glueck is supervising an extensive research pr gram at Battelle Memorial Institute to determine th physical properties of copper-base alloys. The findin will be passed on in appropriate form to designer architects, engineers, schools and the trade pres Glueck says the program has already brought salutar results. A valiant effort — but perhaps a case of to little, too late.

How Tough Can You Get? » » A recent ad by T tanium Metals Corp. of America described the harro ing experience of a nine-man Air Force bomber cre as they fought a howling hail storm at 8000 feet. "Fl ing at 400 miles an hour the damage to the B-52 w terrific," the ad recounted. "The windshield smashe The radome was torn away . . . Wing edges were har mered flat. Holes were punched in the wings and e gine nacelles. Flying metal was sucked into the e gines." Well, the ship came through okay, due to t unfaltering performance of the eight Pratt & Whitn titanium version J-57 engines. All eight engines i gested metal. Six of the engines had bits of cowli metal at the end of the high compressor assembly a pieces of magnesium were found stuck to the first sta



MODERN ALUMINUM BILLET CASTING

Only the best in extrusion billet quality is good enough for **The Himmel Brothers Company,** Hamden, Conn. They produce architectural aluminum extrusions, most of which are subsequently anodized. Their new electric billet casting shop using an integrated group of induction melting furnaces has assured a consistent supply of top quality extrusion billets.

Billets are turned out at the rate of 2000 lbs. per hour by one supervisor and two men. Clean and cool working conditions, extensive automation, and negligible furnace maintenance provide a high return on this investment.

We should be pleased to give you more facts about this modern way of melting aluminum.

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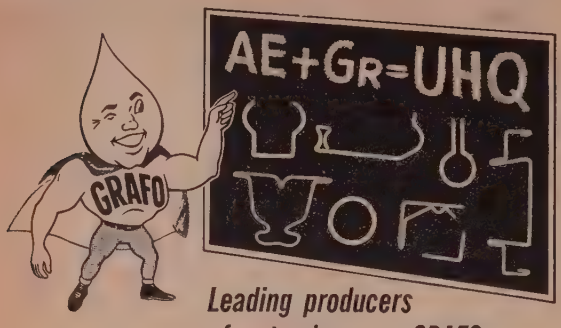
60 CYCLE INDUCTION MELTING

Associated Companies: Ajax Electrothermic Corporation Ajax Electric Company

Happy answer to a problem!



Leading producers of extrusions use GRAFO

Many manufacturers of aluminum extrusions already know the basic answer. It's simply this: *Aluminum Extruding* plus *GRAFO* equals *Uniformly High Quality!*

Why? Because GRAFO Colloidal Graphite dispersed in water reduces die wear, prevents sticking, gives better metal flow and improved production. *Send for booklet "The Biggest Ounce of Protection"*

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turbine blades. But the engines were still serviceable and the damage was repaired with a minimum of time and effort. Most people in the metals field are well acquainted with titanium's rugged qualities, but it takes well documented accounts like this to dramatize the facts. The chemical industry is loaded with documentable stories that would make exciting ad copy. Such case histories would have the virtue of dramatizing another important property of titanium — corrosion resistance — in industrial applications.

Slow, but in the Right Direction » » Dow Chemical is doing all it can to promote increased consumption of magnesium mill products. Tooling plate, used in some degree by most of the auto manufacturers, represents a good volume field. One firm is using magnesium channels and I-beams in a master gage mounted on a 135-pound master frame fixture. Another car maker is using square magnesium tube in a similar tool. (This last item was designed by an outside engineering firm for the auto manufacturer who specified the type of tool but not the material.) Generally, magnesium is making headway for jigs and fixtures in the Motor City. Detroit is getting more missile work, and the influx of missile engineers is expected to boost magnesium for tooling and other uses. None of this activity is calculated to jolt Dow's Velasco plant into activity but painstaking promotions like this are what's needed to keep that uptrend up!

How Will It Go in U. S.? » » Perhaps Skoda Works still means ordnance and other military products to most people, but now the firm's small automobile is being readied for its American debut. The little Czech car has a four-cylinder aluminum engine block and head, with wet cylinder liners and inserted steel valve seats. The four-speed transmission has an aluminum pan and housing. It'll be another thorn in the Big Three's side, with their small car plans — if American in any great number decide it's no crime to buy an Iron Curtain country's product.

Tired Tires » » Despite impressive gains in design and construction of automobile tires, the road-weary tubes are wearing out faster than ever. Tire makers place the blame squarely on the auto makers, according to a feature in the *Wall Street Journal* early this month. The big reason, of course, is that the bloated buggies that have been rolling out of Detroit these past eight years simply weigh too much. Back in '49, Chevrolet's smallest model weighed 3,060. Its '59 counterpart tips the scale at a hefty 3,700 gas-burning, tire-killing pounds. The picture's even worse for the big makes. Tire makers decry the bigness trend (though they sell more tires as a result), but it's John Q. Motorist who's hit the hardest. With the bills for gas, repairs, insurance and new tires on the rise, the old jibe, "Get a horse!" could take on a new and significant meaning. But there's a ray of hope. The auto makers will be bringing out their "compact" cars before too long, and at least two of them will have aluminum engines. And once they get used to the aluminum idea the Big Three will probably apply it to most other models. When that day comes, maybe we will get some respectable mileage out of our cars' rubber.

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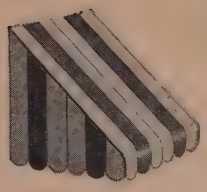

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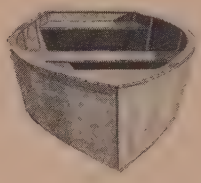

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you fabricate aluminum products—painted or painted—Amchem Alodine can provide you with effective and protective chemical conversion coat- process of remarkable characteristics.

e Amchem Alodine process forms an amorphous ating which becomes an integral part of the metal, nances the natural corrosion resistance of the minum and provides an excellent bond for paint.

Alodine's simplicity, speed and economy as a prepaint treatment has gained widespread commercial acceptance in a wide variety of product applications.

Beyond product, Amchem provides the metalworking industry a complete service—processes, technical and engineering assistance, installation and instruction service—for corrosion protection, paint bonding, or other metalworking problems.

Write for complete information contained in Bulletin 1424A describing the uses of Amchem Alodine, as well as other literature pertinent to Amchem chemical conversion processes for the metalworking industry.

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Useful Data

An air-hardening specialty steel, for critical applications requiring high strength and ductility in aircraft and other structures at low and elevated temperatures, is the subject of an eight-page folder put out by Latrobe Steel Co., Latrobe, Pa. The die steel, called Air Hardening Dynaflex, will resist softening upon continued exposure to temperatures up to 1000°F. The folder gives its nominal composition, physical property data including techniques for forging, annealing, hardening, and tempering, and mechanical property data including room temperature and elevated temperature properties, and stress rupture properties. Ample charts and graphs are included. Contact J. Wandrisco at Latrobe Steel Co., Latrobe, Pa., for technical bulletin No. 1257.

The Pan-Arm contour sawing machine is described in a 26-page brochure by The DoALL Co. New machining techniques which the saw has made possible include fabrication of large machinery parts by cutting them from the solid and the machining of the openings in thick extrusion dies. Various illustrations show machining of a full range of materials including aluminum plate. The saw feeds the cutting head while the work remains stationary, giving the operator freedom of control. For the booklet write to T. N. Busch, The DoALL Co., Des Plaines, Ill.

"Machining Aluminum" is a handy size reference handbook on the subject published by Reynolds Metals Co. The 32-page booklet provides data on machining practices, tool angles and designs, and tool materials. Proper speeds, feeds, lubricants and cutting compounds are explained to machinists and engineers. Eight charts, clearly illustrated and supported by text, cover eight major machining operations: turning, milling, shaping and planing, drilling, reaming, tapping, filing and sawing. The text also explains grinding. Copies can be obtained by writing on company letterhead to Reynolds Metals Co., Dept. PRD-3, Box 2346, Richmond 18, Va.

Joining and sealing alloys and fluxes for aluminum are shown in All-State Welding Alloys Co.'s folder on the subject. Also shown are melt and flow temperatures, recommended filler materials for TIG and MIG welding aluminum alloys, and government specifications met by All-State aluminum products. The brief folder for production, installation, and maintenance weldors and their supervisors is obtainable from V. H. Van Diver, Woolford, Md.

"The Abrasives' Workshop" is published bimonthly by the Coated Abrasive Division of the Curtis Machine Division of the Carborundum Co. The pocket-size publication runs about 12-pages, giving news of various branch plants and background information on various products and processes. The Carborundum Co. also offers a new brochure on diamond wheels for carbide grinding, dealing with bond types, infeed and table speeds, wet grinding, diamond concentration, types of

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FOR ALUMINUM

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A new family of dry salt chromate base coatings designed especially for aluminum. Reduces operating cost.

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MODERN METALS' Market Survey of the light metals consuming industries is once again available to firms that sell to nonferrous metal processors and product manufacturers. The entire light metals market is broken down by state and region, showing the number of plants in 10 industry groups and 71 product categories.

CONTENTS

- **A forecast of production and consumption of aluminum, magnesium and titanium in 1959 and 1960.**
- **Breakdown of 25,339 light metals processors and users by state, region, product.**
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wheels. The folder, entitled "Diamond Wheels for Carbide Grinding," lists recommendations on the six most common applications. Write to E. Dent Lackey, The Carborundum Co., Niagara Falls, N. Y., for either publication.

"Shortcut to Aluminum Sheet," an 8-page reprint of an article that appeared in the March issue of Modern Metals, describes the Hunter continuous casting process, which, in a single casting step, produces aluminum reroll sheet measuring one-quarter inch thick and up to 60 inches wide. Also described are Hunter-built rolling mills featuring several exclusive control features. For a copy, write to R. S. Brill, Hunter Engineering Co., 1495 Columbia Ave., Riverside, Calif.

Olin aluminum pig, ingot and billet entitles an 8-page folder put out by Olin Aluminum. Sections include typical properties of aluminum casting alloys; selection of casting methods and alloys; typical mechanical properties of aluminum casting alloys for sand castings, die castings and permanent mold castings; and pig, ingot and billet compositions. Write to Gayle Maile, Olin Aluminum, 400 Park Ave., New York 22, N. Y.

High-precision rolling, slitting and leveling machinery is shown in actual installations at various U. S. plants in a 12-page folder issued by Stanat Mfg. Co., Inc. Included are wire flattening mills, levelers, bull blocks, accessory equipment, and slitters. Address inquiries to Stanat Mfg. Co., Inc., 500 Shames Dr., Westbury, L.I., N. Y.

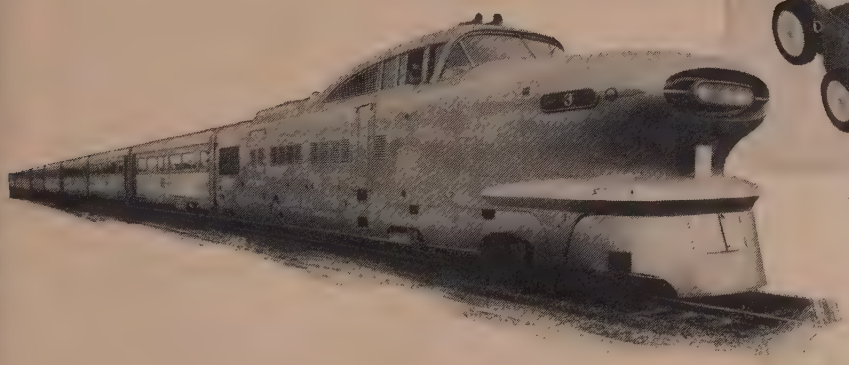
"What Is and How Can You Use High Frequency Heating?" is a comprehensive booklet on the subject put out by New Rochelle Tool Corp. There is a section on questions most frequently asked about high frequency heating as well as a look into its future. Facts about New Rochelle Tool Corp.'s services are also given. The booklet is obtainable from the company, at 320 Main Street, New Rochelle, N. Y.

Residential building products product data are set forth in a 46-page book by Alcoa. It includes specifications, installation procedure and other pertinent information on rain carrying equipment, flashing, utility sheet, nails, fasteners, air diffuser, breather vent, eave fascia, gravel stops, window sills, molding-trim, structural shapes, thresholds, pattern sheet, wall facing, hand railing, ornamental railings. Fifteen panel inserts illustrate available patterns in sheet. Write to Aluminum Co. of America, 754 Alcoa Bldg., Pittsburgh 19, Pa.

A finishing compound for aluminum alloys is described in Technical Data Sheet No. 81, a 3-page usage and instruction sheet prepared by MacDermid, Inc., Waterbury, Conn. Called Electro-Gleam 55, the liquid acid solution removes scratches from aluminum, deburrs, improves corrosion resistance and adherence of plated work, and reduces friction. Aluminum may be used as treated or anodized, chromated or plated. Copies will be provided on request. Write G. C. Kastner, MacDermid, Inc., Waterbury, Conn.

When you buy aluminum for your product...

Lawn mowers



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Your product and scheduling requirements become the dictates of every Anaconda Aluminum specialist the minute your order is written. Their follow-through is what we call custom service.

Because of the extreme flexibility designed into all Anaconda Aluminum's modern production facilities, your order—large or small—is scheduled promptly, shipped on time. Every order receives the personalized attention of experienced aluminum craftsmen throughout production—added assurance that precision controls maintain your critical specifications.

In addition to the satisfaction of such custom-shop service, Anaconda Aluminum gives you all the advantages of integrated production with a full range of products—pig and ingot, coiled and flat sheet, rod, bar, structurals, tubular and other extruded shapes. For custom service on your next order, call your Anaconda Aluminum representative, or write our General Offices, Dept. M-4, Louisville 1, Kentucky.

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This truck type oven is now in service at Penn Extrusion Corporation, Erie, Pa. Close temperature control is maintained through the use of two gas fired, recirculating air heating systems. Other Carl Mayer design features assure trouble-free, economical operation. Write for Bulletin HT-53.

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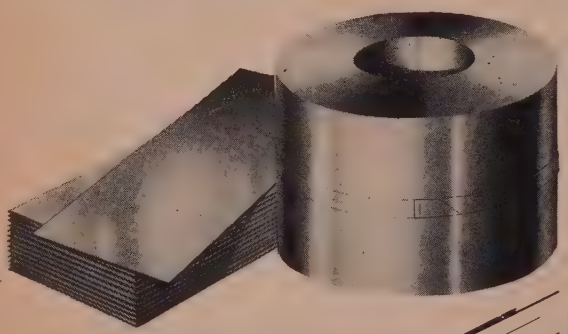

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New Enterprise

Three types of aluminum **clamps** for high tension electrical service are manufactured by Anderson Electric Corp., P. O. Drawer 2151, Birmingham 1, Ala. Type SD aluminum transmission strain clamp comes in sizes for cable from 1/0 to 1,590 MCM; a new hot-line stirrup clamp comes for main cable sizes from No. 8 to 397,500 CM; and Type HLP hot line clamp comes in four sizes (No. 6 to 636 MCM).

A new spark-proof, non-magnetic **fan** made of hardened cast aluminum has been developed by Aget Mfg. Co., 1409 E. Church, Adrian, Mich. Fans are made with filter and condensate element of suction capacity ranging from 600 to 3,600 cu. ft. per minute. Manufacturer states that the aluminum in the fan, which cannot attract metal fragments or give off sparks, reduces the danger from vapors of combustible nature.

Bread boards and hangers for them are machined out of 24 ST aluminum by Dynamic Gear Co., Inc., 20 Merrick Rd., Amityville, N. Y. Boards are jig-bored with 3/16-in. holes spaced on .250-in. centers. Sizes are 8-in. by 8-in., 8-in. by 16-in., and 16-in. by 16-in.

Aluminum Industries, Inc., Cincinnati, Ohio, **manufacturer of aluminum castings,** valves, cylinder sleeves, automotive and brake pistons, is now a subsidiary of Triplex of America, Pueblo, Colo. Triplex operates a smelter and foundry at Pueblo and manufactures aluminum pistons.

An aluminum **feed-in duct** made by Square D Co., 6060 Rivard St., Detroit 11, Mich., has telescoping joints with multiple slots permitting adjustability up to 12 inches. Standard elbows, T's and X's telescope up to 6 inches.

For aluminum brazing Lucas Milhaupt Engineering Co., 5058 S. Lake Dr., Cudahy, Wis., makes **solder preforms,** including notch coil rings, edgewound washers, and special shapes. They are available in Alcoa alloys 718, 716, and 713.

Redwood doors called Tropix-Weve doors slide on hidden **overhead aluminum tracks.** The 9-in. wide panels which come equipped with the tracks are made by Tropix-Weve Products, Inc., 3590 N. W. 52nd St., Miami, Fla.

A 20-ft. **cross** was made of aluminum by Roth Brothers Co., of Youngstown, Ohio, for a cathedral there. Use of a helicopter facilitated installation.

A **Canopy Kit** made by Barclite Corp. of America, 385 Gerard Ave., New York 51, contains precut materials for erecting a canopy. These include hardware, aluminum framing, fiberglas reinforced panel.

A complete line of precision cast aluminum holders for **outdoor floodlights** is made by Stonco Electric Products Co., 333 Monroe Ave., Kenilworth, N. J.

Alcoa puts the metal where you want it

This "tree" represents six stages in the growth of an Alcoa® Impact. Actually the flow of metal occurs at a blink of the eye, but we've shown it in stages, outside the die for the sake of clarity. Furthermore, the finished piece (which you see on the bottom) has no practical use. It has, however, practical value. It starts the imagination fiddling with a host of design problems that involve the joining of several spokes to a central hub. For instance, it's not hard to imagine the spoke frame for an automobile steering wheel or horn ring sitting in its place. If that idea has you going, bear in mind that we can make

the same way. Finished parts in many instances have greater *strength* than forgings —with *tolerances* down to plus or minus 0.005 in.—with a smooth, corrosion-resistant finish of about 125 microinches. A clear case of putting the metal where *you* want it.

In impacts, as well as forgings, castings, extrusions and screw machine parts . . . Alcoa puts the metal where *you* want it. A call to Alcoa can mean fewer rejects or ingenious design solutions. Start now; write for Alcoa Up-To-Daters, a file of design tips on Alcoa Engineered Products. Aluminum Company of America, 928 Alcoa Building, Pittsburgh 19, Pa.

Your Guide to the Best in Aluminum Value

ALCOA ALUMINUM

Alcoa puts the metal where you want it – in castings, forgings, extrusions, screw machine parts and impacts.

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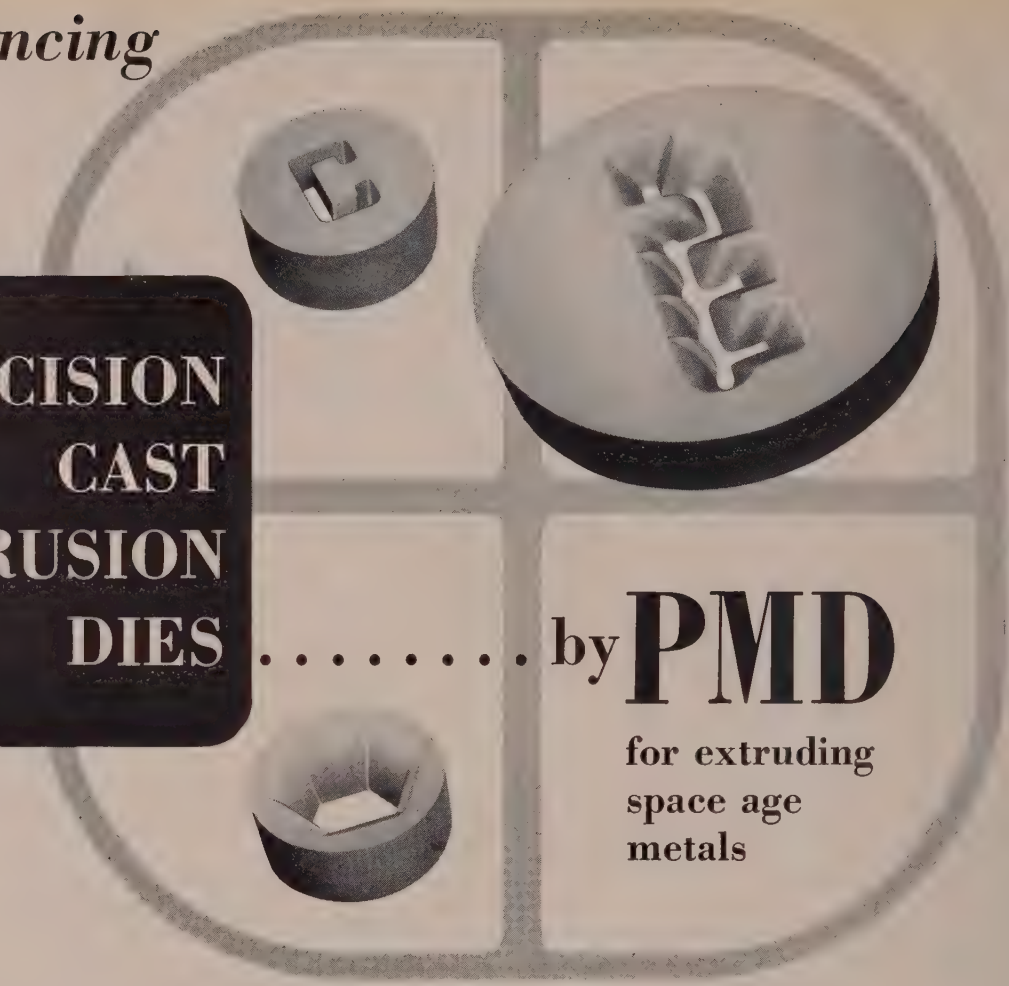

PRECISION CAST EXTRUSION DIES . . . . . by PMD

for extruding space age metals

NOW, in our own Shaw Process foundry, PMD is producing precision cast dies for extruding the new space-age metals such as titanium and A286 stainless steel, as well as copper base alloys and steel alloys.

These and other hard-to-work alloys can now be extruded at temperatures of up to 2,200°F with dies precision cast by PMD in alloys such as the chromium and tungsten hot-work steels, tungsten and molybdenum high-speed steels, and cobalt base alloys.

Extruders of these tough metals report closer tolerances, longer die life, superior die performance, and trouble-free operation with precision cast extrusion dies by PMD. These high temperature dies are designed and produced to the same high standards of craftsmanship that have made PMD the symbol of quality and dependability in aluminum extrusion dies.

PMD has the men, machines and experience to solve your difficult extrusion die problems.

PMD SERVICES FOR EXTRUDERS AND DIE CASTERS

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or pole-top, mid-pole, wall or cross arm mounting. A special heavy-duty vapor-tight unit offers premium service advantages in locations exposed to heavy moisture, corrosive fumes or non-combustible vapors.

Porta-veyor is the trade name of a new aluminum **portable conveyor** which operates flat or at angles to 30 degrees. Capacity is 400 lbs. Drive unit is completely enclosed; motor operates at ⅓ or ½ hp. Bunke-Musser Inc., Box 147, Jackson Center, Ohio, makes it.

Clark Equipment Co. is building a **factory** just outside Michigan City, Ind. Truck trailers of the Brown Trailer Division will be manufactured as well as cargo van bodies and shipping containers.

A new aluminum **rafter vent** for homes with unenclosed eaves can be installed in seconds with four aluminum nails. A series of slots enables the rafter to meet FHA ventilation specifications. Manufacturer is Aluma Kraft Mfg. Co., 1330 N. Rock Hill Rd., St. Louis 17, Mo.

Transit cases for protective packaging are manufactured from laminated sheet aluminum and plywood or all aluminum to military specifications by White Aircraft Corp., Palmer, Mass.

Safety **ladder** developed by Howard B. Rich, Inc., Carrollton, Ky., has wood side rails but aluminum rungs which will not conduct electricity and which will not split, rot or warp.

"Pocket" **patio doors** consist of any number of rolling glass and aluminum panels which slip into a wall recess when full exposure of patio opening is desired. They are a product of Shower Door Co. of America, Ltd., 1301 Chattahoochee Ave., NW, Atlanta, Ga.

Lightweight aluminum **draftsman's device** called Rollo-Draft attaches to sides of drafting board to permit draftsmen to roll out fresh paper as needed, and to store completed sections of drawings on another roller. Spring tension keeps paper smooth. Rollers lock to hold paper in place. The development is a product of Aqua Sportsman, Inc., 2518 Leslie Ave., Cincinnati 12, Ohio.

Aluminum **sawhorse legs** made by Alum-A-Lok Products, 136-138 Church St., Groton, N. Y., fold for convenient storage in any out-of-the-way place. Either 20- or 30-inch high units can be set up in seconds. A twin locking system holds legs securely in either position. Rubber feet are skid-resistant.

The Squee-Zit **oiler** consists of translucent plastic bottle, equipped with either angular or straight nozzle and tube of aluminum. Standard size is eight ounces. Butler Stamping Co., 1000 Shore Street, Butler, Pa., is the manufacturer.

The Chicago Hardware Foundry Co., North Chicago, Ill., is erecting a new 8000 sq. ft. aluminum and brass foundry building to supplement the company's

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new $100,000 aluminum molding and melting building for receiving, casting, finishing and shipping of nonferrous metals.

Ekco-Alcoa Containers Inc., Wheeling, Ill., makes a new oval octagonal crimp-top **foil container** suited for coffee cake and many types of sweet goods. Capacity of the 10 in. by 7-in. dish is 32 fluid ounces.

Hampden Brass & Aluminum Co., 262 Liberty St., Springfield, Mass., has two new die casting machines, each of 1000 tons' capacity. Each machine injects 25 lbs. of aluminum, 60 lbs. of zinc; has casting capacity of 900 square inches of aluminum. "Speed and efficiency will soar to new heights at Hampden Brass," said President Joe Deliso.

Sturdy aluminum **boats** are being produced at FEPCO Mfg. Co.'s new plant at Tishomingo, Okla. First boat produced was a 14-ft. aluminum cruiser. The company will market prefabricated kits for such boats as well as ready-made models.

Aluminum screens and **sliding glass doors** with patented flush locks all etched and anodized are two of the many products made by Carco Industries, Inc., 2155 N.W. 25th Ave., Miami, Fla.

Cast aluminum **feed box** made by Metcast Corp., Box 141, Holly, Mich., holds over 3 gallons of wet or dry feed for horses.

Some 365 aluminum tubes fit inside an aluminum shell to make a **heat exchange unit** of 28-ft. length, 49-in. diameter over the largest flange, and 11,000 lbs. weight. Henry Voght Co., Inc., 1000 W. Ormsby, Louisville 1, Ky., manufactured the unit.

Engines fabricated from aluminum and Hastelloy are used by Dynex Inc., Hasbrouck Heights, N. J., in ramjet target missiles with Mach 3 capability at 90,000 ft. The Dynex drone is 12 ft. long and weighs 766 lbs.

Extruded aluminum **grilles** have been developed for a range of applications by Waterloo Register Co., Inc., P.O. Box 72, Waterloo, Ia. They can be used for supply or exhaust grills in heating and air conditioning systems or for sidewalk air distribution.

Aluminum is used in fabricating an adjustable **door jack** by Freeman Doorjack Co., Box 666, Painesville, Ohio. The jack, which is adjustable for any size door, holds doors firmly in place for fitting and hanging. Rubber feet won't slide on any type of floor.

Alside Inc., manufacturer of **aluminum siding**, has a new $1 million plant about 1½ miles north of Cuyahoga Falls, Ohio.

An explosion-proof portable fixture to enclose a 110 watt lamp is made by Appleton Electric Co., 1713 Wellington Ave., Chicago 18. The globe is protected by a **cast aluminum guard** with a hook on the end for attachment. Unit weight 4¼ pounds.

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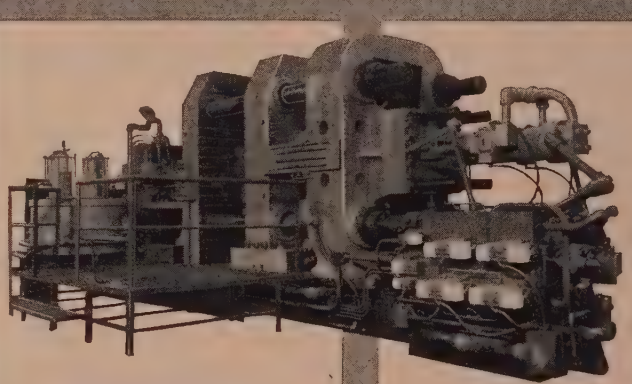

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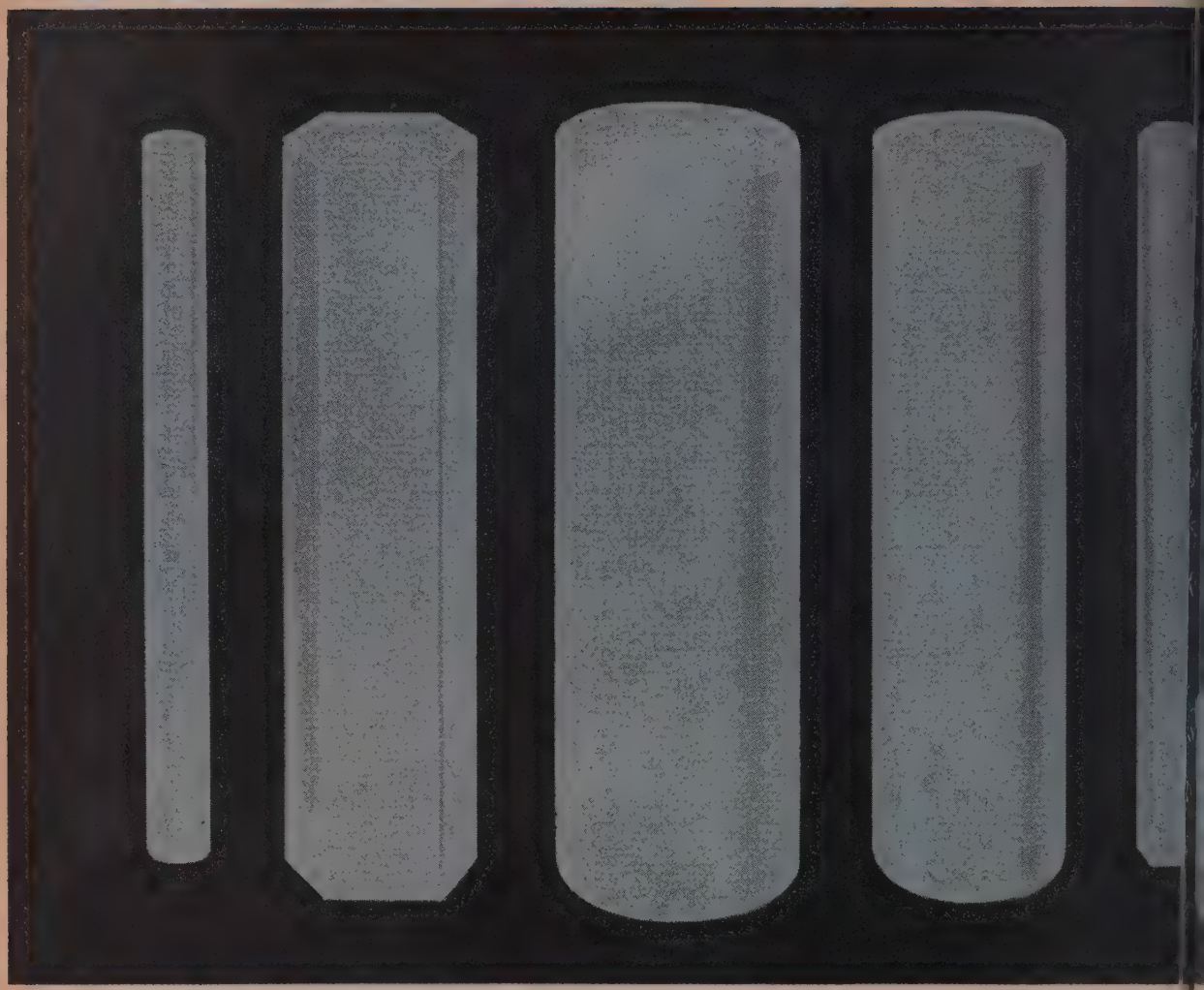

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WHY

porcelain enameled aluminum signs are money-savers

By J. G. Breedlove, Research Director
Titania Division, American Lava Corp.
Chattanooga, Tenn.

PORCELAIN enameled aluminum signs that last ten times longer than baked enamel with virtually no maintenance to eat away leasing profits, and that save sign buyers installation and replacement costs, are being produced by Bradley Neon and Porcelain Corp., Missoula, Mont.

Alan Bradley, president, estimates that the previously used signs with baked enamel finishes lasted three years at most before repainting was necessary. Signs were then repainted on site and never fully achieved the appearance of a new sign. Each sign needed repainting every year after the first repainting.

Not only did such a maintenance schedule detract from the appearance of the sign, but the lessor also had to shell out an estimated 25 to 30% of the sign's annual return.

Signs of porcelain enameled aluminum would retain their appearance indefinitely and could be made for slightly more than the cost of baked enamel finishes on steel, Bradley discovered. Contributing to decades-long life of such signs are the weather and shock resistance of the vitreous porcelain enamel and the non-oxidizing aluminum.

Additional mounting holes may be drilled or punched in the signs on the job if necessary, without chipping the porcelain or danger of rust at the exposed edges. Bending and flexing during installation does not cause the enamel to crack or flake off.

Savings are not confined to the sign maker, according to Bradley. Companies using the signs also benefit.

Users Benefit, Too

A western power company used baked enamel warning signs on their high voltage power poles. Life of the signs—which cost $6.50 each—was about three years. The company changed to porcelain enameled aluminum signs at $7.50 per, and anticipates a sign life of more than 30 years.

The porcelain signs will save an estimated $57.50 per sign in installation costs over a 30 year period—a $57,500 saving on 1000 signs, for example. Damage due to target practice does not shorten the life of the sign because bullets simply puncture the aluminum without "dishing" it or cracking the finish. Nor does the aluminum oxidize away from the finish or stain it.

A midwestern produce firm used large lithographed cardboard signs for outdoor advertising of their fruit. The lithographed placards cost about $7.50 apiece and were replaced as often as four times a season.

The firm changed to porcelainized aluminum signs advertising two different fruits—one on each side—at between $30 and $40 per sign. The porcelain signs have been in use several seasons with no deterioration in appearance. Costs for the first season were slightly more for the porcelain signs, but the decade or more of additional sign use expected by the produce firm will be free of sign cost.

Bradley Neon and Porcelain Corp. uses a lead-free porcelain enamel frit manufactured by American Lava Corp., a subsidiary of Minnesota Mining and Manufacturing Co. It has greater adhesion, coverage, abrasion resistance and resistance to chemical attack than lead-bearing frits, according to the sign maker. Thinner coatings are possible due to greater opacity and markedly lower tendency to dissolve pigments and opacifiers. Color reproducibility—even of brilliant reds and yellows, as well as pure white—is also easier, Bradley said.

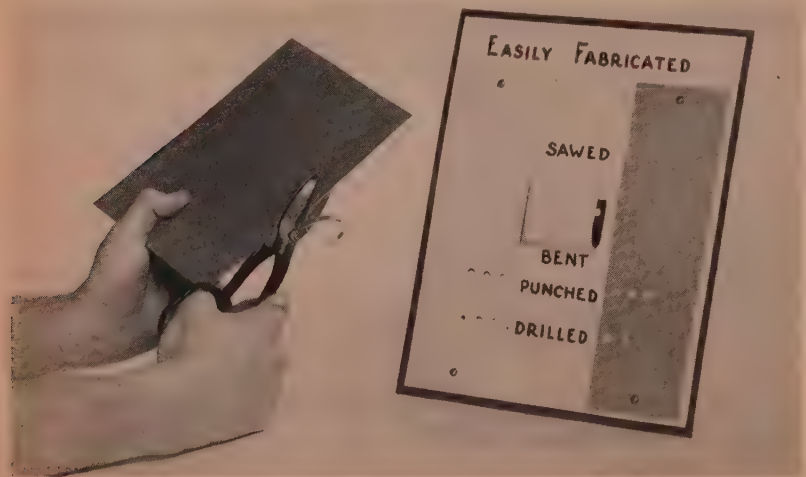
Clean, Etch Metal

Before enamel is applied, the aluminum base is cleaned in an alkaline bath and etched in mild chromic acid. Then the frit, additive agents and oxides for color are placed in a ball mill with a measured amount of water. The mixture is milled from five to ten hours until it is the consistency of cream.

The chemically active frit mixture, or slip, is then sprayed on the aluminum with conventional spraying equipment and fired to maturity. Additional colors may then be silk-screened in the desired patterns in additional layers and allowed to dry before firing.

First quality signs are fired after each color is silk-screened. In some cases, colors are fired together but the gloss is usually reduced by laying the screen on the bisque. Being made with the same base frit, all colors are mutually compatible.

Overfiring of the enamel due to repeated exposures poses no problem due to the exceptionally long firing range of the enamel coating. Total firing times as long as one hour have been used with no sacrifice of quality.



■ *The above demonstration chart of porcelain enameled aluminum's ease of fabrication suggests the ease with which the restaurant sign (top of page) was made.*

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GOOD DESIGN . . . i

Swiss firm makes good use of heavy aluminum extrusions in its line of durable, good looking railings for stairways, balconies, etc. Ingenious erection method extends versatility.

By M. Spescha, Aluminium S.A. Menziken, Menziken, Switzerland

THE USE of light metal for balustrades is not in itself novel. For many years aluminum handrails have been fitted to iron balustrades and, in special cases, all-aluminum balustrades have been produced as forged assemblies with many intricacies of design and form. Up until recently, price has been a limiting factor in comparison with iron, causing aluminum applications to remain largely undeveloped.

There remained to be discovered ways of drawing increased attention to the use of light metal for balustrades. The method developed, over the past four years, by which Aluminium S.A. Menziken has fostered the use of aluminum for interior and exterior guard rails and balustrades has been through standardized design and construction techniques which are protected by patents in Switzerland. the U.S.A.. Great Britain and many other countries.

This standardization has enabled Aluminium Menziken to produce and stock the necessary sections for quick delivery to franchised builders and metalworking firms.

In developing this method of distribution and assembly, we had recognized that, apart from the use of a practicable minimum of metal, a practical fabricating method had to be found in order to arrive at a satisfactory final cost. Apart from economic considerations aesthetic appearance was of prime importance, so we enlisted the aid of a number of well known architects.

The novelty of the development is in the simplicity by which upper and lower horizontal members are joined to the posts and rails by locking pins to give the balustrade units the necessary rigidity. For outside applications, where installations are exposed to marked changes of temperature, provision is made for expansion and contraction.

Market research indicated that architectural requirements can be satisfied by two sizes of balustrade: Type I satisfactorily meets demands for normal balcony and staircase balustrading while Type II is specially suitable for public buildings where higher stresses may be imposed by the presence of large numbers of people.

Figure 1 illustrates sizes of various balustrade component sections as well as fastening methods.

Figure 2 shows side views of staircase balustrades. The upper and lower horizontal members consist of a special U section (Fig. 1-1) provided with a groove for insertion of the locking pin (Fig. 1-2). The handrail is formed of another section (Fig. 1-3) specially adapted for internal use and for sharp turns. This component is attached to the upper horizontal member with countersunk screws (Fig. 1-4). The posts are square tube (Fig. 1-5) with possible variations such as rectangular tube (Fig. 1-6) or round tube (Fig. 1-7). The posts are attached to the upper and lower horizontal members by locking pins.

Attachment to a stairway or to the ground is by 24 by 24 mm. square rod (Fig. 3-8), which may be galvanized steel; a rosette may be provided if required (Fig. 3-9). Rails may consist of flattened tube (Fig. 1-10 or 11), or of round tube (Fig. 1-12). Rails are attached to the horizontal members by means of locking pins (Fig. 1-13).

Sound Deadening Element

In order to limit noise to a minimum under conditions of heavy loading, there may be interposed beween the horizontal members and the posts or rails strips of plastic material (Fig. 1-14). For internal use, butt joints between the horizontal members, use is made of two galvanized steel plates (Fig. 1-15) which are inserted into the section across the joint and, being forced apart by two hidden screws, grip the internal walls of the section strongly, so holding the two elements of the joint together.

Figure 4 shows two possibilities for mounting a plastic handrail on the standard balustrade. In one case the handrail is screwed on to the upper horizontal member from below (Fig. 4-16), while in the other the plastic section (Fig. 4-17) is drawn over the section (Fig. 4-18) forming the upper horizontal member.

Figure 5 demonstrates in principle the assembly of a balcony balustrade. The handrail consists of a section (Fig. 5-19) provided with a slot for the insertion of special retaining screws (Fig. 5-20). This method of fixing has the advantage of not requiring any threaded holes to be made in the handrail itself; moreover, the drilling of the holes in the upper horizontal member (Fig. 1-1) can be undertaken independently of the handrail. The other sections used in this assembly are the same as those previously described.

Where these balustrades are used for outside purposes thermal expansion to the extent of 1-1.5 mm. per meter run of balustrade must be allowed for. It is recommended that balustrades be divided up into units each about 3 meters long (Fig. 6) with at least every third post acting as an expansion joint. Constructional details are those given in Fig. 5, the butt joint in the upper transverse member being made with an inserted section (Fig. 5-21) and the lower joint with a plug (Fig. 5, detail V). Butt joints of the handrail (Fig. 5, detail III), which may be made independently of butt joints in the balustrade structure itself, are made with a section corresponding to the internal form of the handrail cavity (Fig. 5-23) which is fastened by screwing to the upper transverse member. On the handrail itself,

ils for stairs

Complete details of the Swiss-designed balustrade system. Extrusions supplied by Aluminium Menziken are formed and custom installed by licensed metalworking firms.

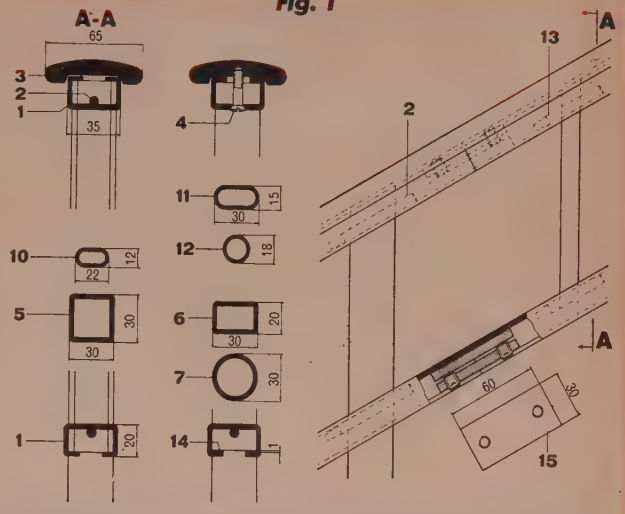


Fig. 1

Fig. 2

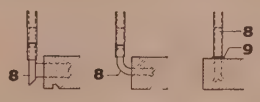


Fig. 3

Fig. 4

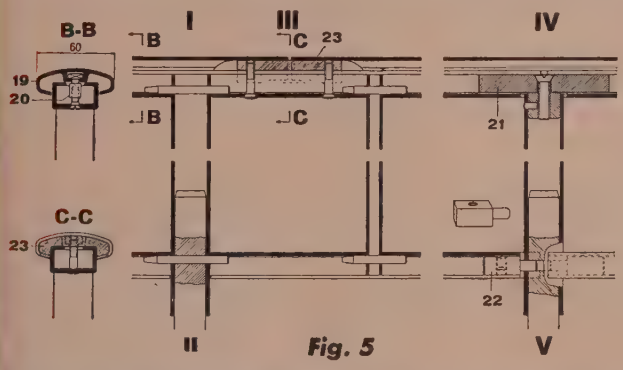
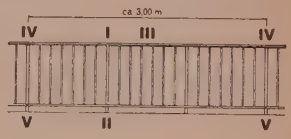


Fig. 5

Fig. 6



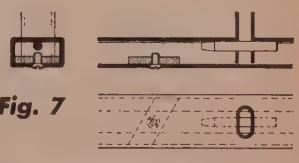


Fig. 7

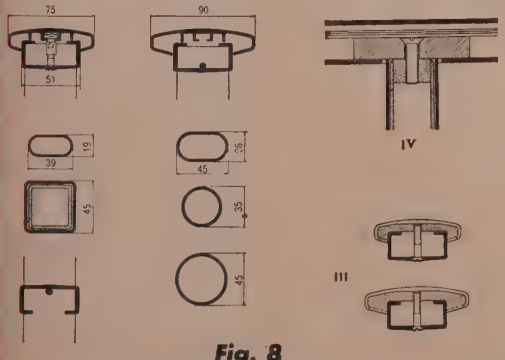


Fig. 8

Fig. 9

Fig. 10

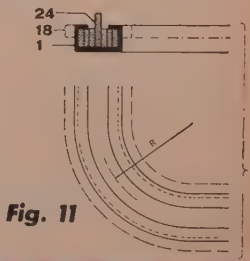


Fig. 11

■ *Fig. 12 (left). Bending section for upper transverse member of stairway balustrade system. Fig. 13, milling operation on section for upper transverse member. Both views were taken at the metalworking firm of W. Nill, Winterthur, Switzerland.*

the inner ribs and a part of the section on each side are milled back to permit assembly, dismantling and free expansion. Should it be so desired, a closure may be provided to the opening in the underneath face of the lower transverse member as shown in Fig. 7.

Balustrade Type II. The principle of construction illustrated in Fig. 8 is the same as that previously described except that heavier sections are selected throughout. The posts consist of a full length of round or four-sided steel tube sheathed with an Anticorodal tube. The handrail is either 75 or 90 mm. in width while the maximum distance apart of the posts is 1.25 meters (Fig. 9). Fig. 10 shows a method for fitting a light-metal closure (sand or gravity casting) to a 90 mm. handrail. Front closures can be fitted to the other handrails in the same way.

How They Fabricate

Fabrication of the balustrades demands the provision of certain equipment as well as knowledgeable and careful workmanship.

Milling or punching operations. For milling the openings for the insertion of rails and posts in the transverse members, some simple form of milling machine is required; in the case of round rails, however, a drilling machine is sufficient. With horizontal balustrades, the slotted section used for the transverse members permits openings of any desired form to be punched for the rails and posts. Thus, in all the balustrades for the Neubau "Waadt-Unfall" in Lucerne the openings were punched. The punching operation is applicable in most of the other assemblies referred to as, for example, in the case of the balcony balustrade of the Kantonsspital in Winterthur; here, a thousand-meter run of horizontal section was pierced by stamping.

Bending. The production of bends of small radius, such as occur principally in staircase balustrading, requires some skill. Thus, for example, in Figure 11 the section (Fig. 11-18) is bent to a mean radius of 70 mm. To achieve a perfect bend, a steel pattern must be used, and at the same time the cavity in the section must be filled with strips of soft aluminum (Fig. 11-24) which are removed when the bending operation is completed. The bending of the handrail section (Fig. 1-3) introduces no difficulties. On the other hand, it is recommended that if sharp bends are to be made in the handrail shown in Fig. 5-19, then the internal ribs should be milled off, and the interior cavity be plugged with the section shown in Fig. 5-23. Figures 12 and 13 show milling and bending of the section for an upper transverse member at the works of W. Nill, Metalworkers, Winterthur.

Material and surface treatment. With an eye to easy forming by bending, sections for handrails and transverse members are in alloy Al-Si-Mg12, while posts, rails and locking pins are also in an aluminum-silicon-magnesium alloy. Iron parts are galvanized and screws are of galvanized steel or chromium-plated brass; for external use, stainless steel screws are recommended. Visible surfaces are polished and anodically finished in natural color or, if so desired, appropriately dyed.

Many More Designs

The illustrations presented in this account give only a selection of balustrades built according to the method developed by Aluminium AG. Menziken and installed in Switzerland; already they have found many applications abroad. The sections, the selling rights of which are retained solely by the company as patentee, are available to all metal constructors and metalworkers. However, it should be pointed out that in order to achieve perfection in fabrication, some previous experience in the working of aluminum alloys is required.

Advantages

Some of the advantages of this construction system follow:

Simplified fabrication and reduced material requirements.

Mass unit production makes for favorable prices. (In Switzerland this maintenance-free balustrade system costs not more than 10-20% more than a painted iron assembly.)

Simple assembly by means of locking pins.

Compact system for the joining together of units obviates need for high precision in the sections, as the locking pins take up any reasonable variations.

Handrails separately attached, thus permitting variations in their shape.

Use of plastic handrail is made possible.

Possibility of inserting the rails into punched slots or punched round holes in the horizontal members; in the case of volume production this makes for greater economy than is possible by milling or boring.

Sections and joining elements are of standardized form; may be stocked.

The possibility of changing individual damaged rails without dismantling the complete balustrade element.

Pleasing design.

The application possibilities of these balustrades are very numerous and there is no doubt that this new development in the use of light alloys has a great future and will continue to expand at an increasing rate. Finally, it should be noted that the method of construction described is protected in the U.S.A. under Nr. 2808233. Applicants for sales and installation rights should make direct contact with the company — Aluminium S. A. Menziken in Menziken, Switzerland.

New MEAKER "Uniline" plating machine steps up production at UNION STEEL

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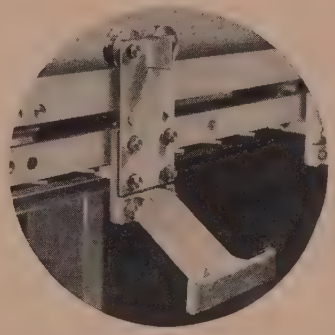

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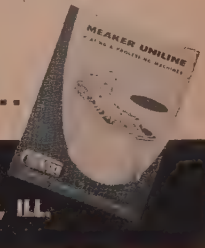

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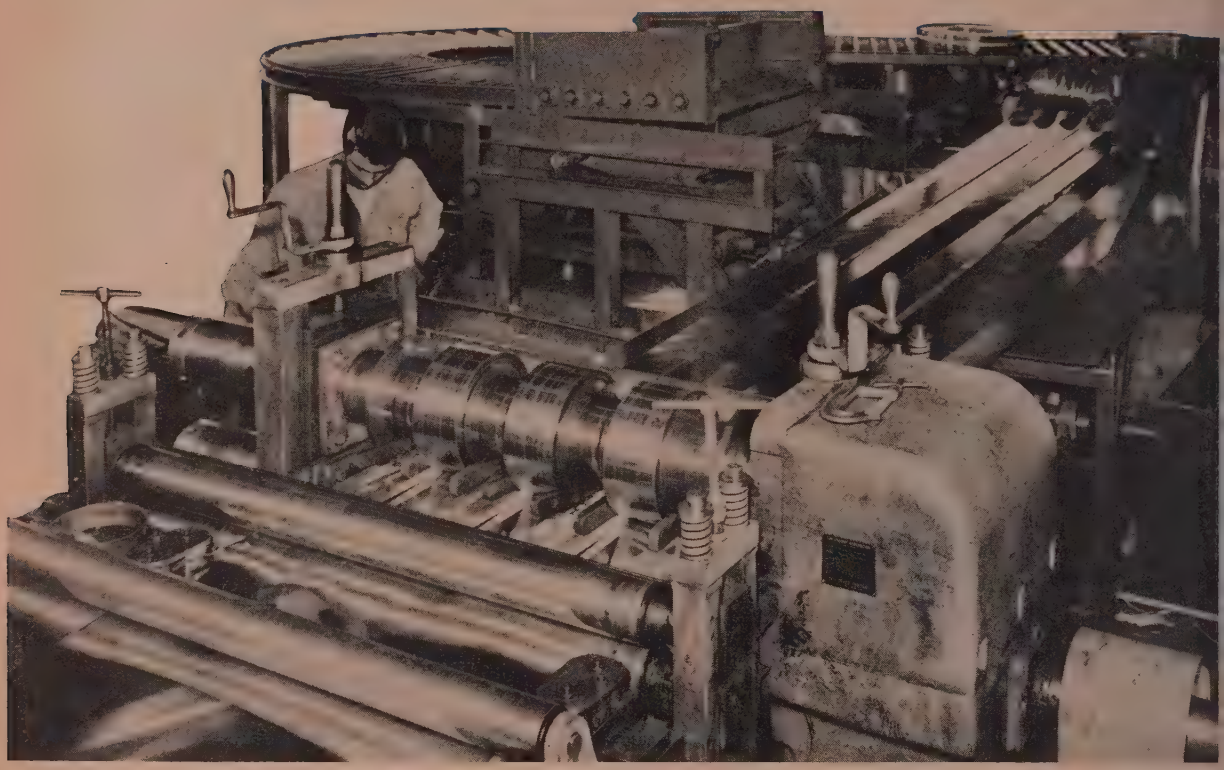
CUSTOM ROLLING . . . *A La Mode*



With more than 50 years' experience behind it, Eastern Rolling Mills, New York, mirrors the vicissitudes of metalworking and distributing. Today, as a sheet-roller, Eastern meets the competition of the big suppliers with quicker deliveries, better-than-commercial tolerances. Photo shows 48-inch slitter in operation.

THE WAY to a fair profit for aluminum sheet rollers and distributors is a tortuous one these days, what with the increasing diversity of primary producers' products and services and their flexibility of operations in prosperous and slow periods.

Consider, then, the resourcefulness of Eastern Rolling Mills, Inc., Bronx, New York, a custom mill which successfully competes with producer *and* distributor by reason of *its* broad services to some 3,000 end product manufacturers.

There was a time — when Eastern was a distributor — when the great majority of these customers were classed as "small." Today, however, the firm's customer list includes General Electric, Curtiss-Wright, Carrier Corp., Phelps-Dodge and many others of like size. Limiting itself, as it does to a 400-mile delivery radius, Eastern is not only a metal storeroom for its customers, but a fabricating department, in many cases, as well.

Eastern can deliver an order within three or four days if necessary; its normal delivery schedule being two to three weeks—still faster than the four weeks or longer common for the industry. Add to this the firm's specialty of close tolerance aluminum rolling, slitting and cutting to length, and it's easy to understand why their aluminum sales are an increasing factor in the company's overall business.

Speaking of this precision operation, Eastern's president, Herbert Barchoff, said, "We are equipped to produce all of the non-heat treatable commercial alloys up to 20 inches wide of finished width. These can be cut to length and flattened to any given multiple length. We believe this feature to be important because it gives the customer the equivalent of 'filet mignon' in that every square inch of the metal we sell is usable without the necessity of reshearing with the resultant extra labor and scrap generation.

"In addition," Barchoff continued, "we do round edging on a machine that we built ourselves. This product is sold wherever a finished edge is required."

Another Eastern specialty is rolling to tolerances considerably closer than the accepted ASTM standards. They do this on an ultra-modern 20-in. wide, 2-hi mill having a top speed of 600 fpm. Prior to this acquisition, Eastern bought 37½-in. wide aluminum coil stock from the various primary producers and slit it for re-rolling on its 12½-in. wide, 4-hi, 200 fpm mill. Now, however, they buy 17 to 20-in. coil stock at the same low mill prices and eliminate that initial slitting operation. The new high-speed mill satisfies about 98% of the firm's coil market.

But here again, precision operations are added to production speed, for the mill rolls aluminum to exceptionally close tolerances. As an example, for the thickness on which ASTM specifies a 0.002-in. tolerance, the mill can bring

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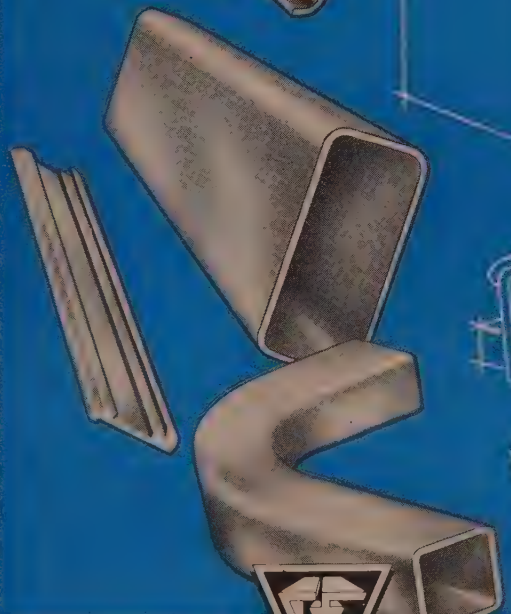

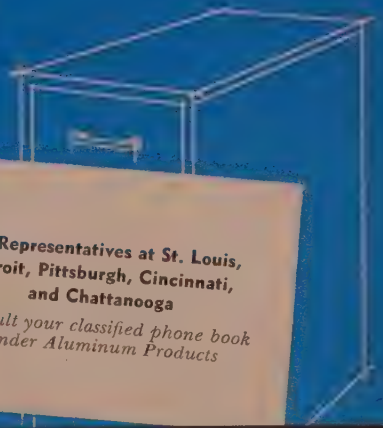

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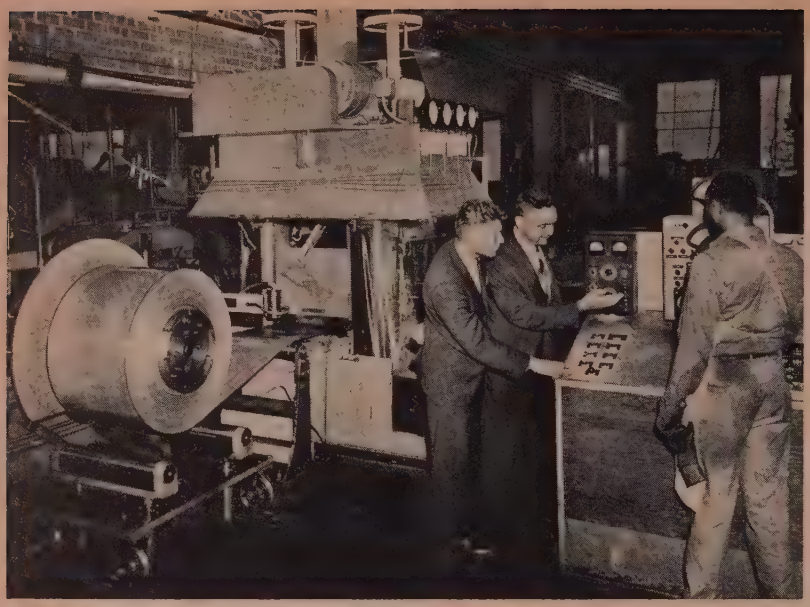


■ *Eastern Rolling Mills' new 2-hi, 20-in. cold rolling mill is shown producing coil stock as Herbert Barchoff, president (right), briefs a visitor on remote controls that set space between mill rolls.*

the same thickness within 0.0002-inch.

"This unusual accuracy permits us to offer a certified 'bonus' of extra metal to the consumer because of these close tolerances," Barchoff pointed out.

Want Proof?

A radio parts manufacturer switched from the primary producers because it learned, by actual tests, that Eastern's closer rolling tolerances resulted in more sheet per pound of metal, with no difference in price. This is no isolated example of the firm's accomplishment.

When Barchoff mentioned "certified" he was referring to electronic control of the thickness of the rolled stock. At the mill exit, an X-ray beam reacts continually to the density of the sheet flowing beneath it. Fluctuations in density are continuously fed back to the mill control panel for observation, but are also automatically transmitted to the 5-hp screw-down motors which minutely adjust the position of the mill upper roll. This equipment is so sensitive that it can detect and correct variations of one per cent in the thickness of the sheet.

"Certification" can be provided, when desired, by a stylus which reports on a chart in response to the X-ray beam a continuous record of metal thickness from beginning to end of the coil.

Another accuracy feature is contributed by the maintenance of tensions on the metal on each side of the mill. The mill take-up reel is equipped with a variable tension device which reduces tension as the diameter of the coil builds up. This also reduces ripple or camber in the coil. At the same time, the pay-out reel mechanism has a variable drag so that the metal is held taut with a constant pull in relation to the needs of a steadily decreasing coil diameter.

Mill down-time is kept to a minimum by other electronic devices. For instance, coil changes are speeded by an electric eye which collapses the mandrel of the take-up and simultaneously causes the coil car to be raised under the coil as soon as the end of the coil leaves the mill. Similarly, the mandrel of the pay-off stand is collapsed automatically, so the next coil can be pushed over it quickly.

Motors Galore

Motors are vital to this operation. In addition to the 300-hp main drive motor driving the mill rolls through a 34,000-lb. bull gear and the 50-hp take-up motor, 11 auxiliary motors are tied in with this operation. A 40-hp motor, for example, drives the cooling lubricant pump which blasts 250 to 300 gallons of oil per minute on the rolls.

The cooling oil flows to a sump and from there to a settling tank, through 72 filtering elements, and then on through water-cooled heat exchangers before delivery again to the mill rolls. Because such large quantities of oil throw up a continuous oil mist, the rolls are enclosed and the oil vapor is collected by a high-voltage Precipitron system.

Slitting operations are carried on with equal efficiency. Eastern's large 48-inch slitter can handle a single coil up to eight tons in weight, 48 inches in width and over two miles long, while making up to 36 cuts in one operation.

Eastern's newest slitter has two interchangeable slitting heads so a new set-up can be made on one while the other is in operation. This machine has been automated by means of electronic connection between the take-up stand and the coil turn-over unit by which complete coils are unloaded from the take-up onto a conveyor automatically. These slitters and smaller units at Eastern can slit to widths down to 3/64-in. which can be adjusted in increments of 0.001-in. to an average tolerance of less than half the ASTM standard.

"We also do design rolling on aluminum and have well over 200 individual embossing designs," Barchoff said. "Of course, we have annealing equipment with controlled atmosphere."

In the light of the precision service rendered by Eastern Rolling Mills, it's not surprising that the firm's roots lie in manufacturing rather than warehousing. The company was founded in New York in 1908 by Abraham Barchoff who had been a metal worker in Russia. He and a partner, Morris Dreilinger, made brass lamp bases, using three lathes and a foot-operated stamping press.

Expansion Starts . . .

By 1910 the firm had acquired larger quarters, a power press, and a third partner, and changed its name to Eastern Metal Spinning & Stamping Co. New products were umbrella stands, cuspidors and other deep drawn items. In those days the firm kept Loew movie houses supplied with brass cuspidors, no small order.

As a small firm, Eastern Metal Spin-

■ *Plant man guides an aluminum coil onto rolling mill payoff, which has automatic edgewise control. In the background, right, is part of the back-tension mechanism.*

Be Specific . . .

. . . that's how to get maximum profit out of your industrial advertising dollar in today's competitive metalworking market.

And here's a market—the light metals industry—that's not only specific, but also growing fast. The industry is summarized below, showing the 25,339 plants by industry category and by region. Every one of these plants processes and/or uses aluminum, magnesium, or titanium in the manufacture of end products.

CENTRAL STATES

	East-N. Central	West-N Central	East-S. Central	Total
BUILDING INDUSTRY	1759	768	281	2808
CONSUMER DUR. GOODS	728	175	73	976
CONTAINERS & PKG.	198	50	12	260
ELECTRICAL INDUSTRY	678	114	43	835
MACH. & EQUIP. (Non-Elec)	1065	271	58	1394
SCIENTIFIC & TECH. INST.	323	54	13	390
TRANS. & PARTS	708	142	53	903
ORDNANCE & MILITARY	22	5	9	36
LIGHT METALS PROC	2663	461	184	3308
MISCELLANEOUS INDUS	363	80	31	474
Area Totals	8507	2120	757	11,384

WESTERN STATES

	Mountain	Pacific	West-S. Central	Total
BUILDING INDUSTRY	163	621	481	1265
CONSUMER DUR. GOODS	18	148	61	227
CONTAINERS & PKG	5	63	30	98
ELECTRICAL INDUSTRY	14	183	46	243
MACH. & EQUIP. (Non-Elec)	21	211	107	339
SCIENTIFIC & TECH. INST.	14	74	32	120
TRANS. & PARTS	40	310	101	451
ORDNANCE & MILITARY	7	30	5	42
LIGHT METALS PROC	91	642	289	1022
MISCELLANEOUS INDUS	9	43	29	81
Area Totals	382	2325	1181	3888

EASTERN STATES

	North-east	Middle Atlantic	South Atlantic	Total
BUILDING INDUSTRY	436	1681	760	2877
CONSUMER DUR. GOODS	155	459	164	778
CONTAINERS & PKG	48	148	44	240
ELECTRICAL INDUSTRY	247	589	105	941
MACH. & EQUIP. (Non-Elec)	204	599	98	901
SCIENTIFIC & TECH INST	113	280	51	444
TRANS. & PARTS	123	300	143	566
ORDNANCE & MILITARY	15	22	17	54
LIGHT METALS PROC	656	1604	424	2684
MISCELLANEOUS INDUS	127	403	52	582
Area Totals	2124	6085	1858	10,067

25,339 PLANTS

A market survey . . .

. . . by Modern Metals defined and charted this industry, and Modern Metals' circulation list is based on this survey. Here, then, the most accurate and comprehensive light metals industry list in existence. Only Modern Metals has this dynamic list, made up entirely of manufacturing plants, and only Modern Metals is read by every one of these plants. That's why Modern Metals is by far the most efficient advertising medium for companies that supply materials, equipment and services to light metals processors and users.

MODERN METALS

1813 Tribune Tower **Chicago 11, Ill.**

ning suffered from fluctuations in the metal market, so Abe Barchoff began to build metal inventories. Herbert Barchoff feels that this early effort at warehousing led to the firm's position today. It wasn't long before Eastern became the emergency supply source for the local neighborhood.

. . . And Continues

Manufacturing, however, remained the company's main policy, and before long 18 stamping presses and 12 lathes were in operation in nine lofts at Greenwich and Watt Streets. These were followed by a small embossing mill and a gang slitter, the first in the New York area. This combination of equipment led the firm into job fabricating for other end product manufacturers, while it continued to produce its own line. An important factor was Eastern's ability to fill rush orders because of the large inventories of copper and brass it always had on hand.

To Barchoff's partners these large inventories might have threatened disaster in the highly inflated pre-crash months of 1929; in any event the partnership broke up before the crash. Abe Barchoff kept his stocks of copper and brass, plus three lofts, one press, the slitter, the mill and numerous embossing rolls. With these he formed Eastern Brass & Copper Co. With its large stocks of metal the firm was basically a warehouse, but with this difference: It had the converting equipment that enabled it to adapt these stocks to the needs of many fabricators and manufacturers.

In 1934 the company moved to a ground-floor location on Spring Street, and in the next five years grew to a 12-employee operation with an annual turnover of about a million pounds. During this period Barchoff continued to build inventory, sometimes as the sole buyer in the whole New York area.

By 1939, Eastern Brass & Copper Co. carried a four- to five-million-pound inventory in coils, sheets, tubing and rods, a pretty top-heavy supply, in the estimate of young Herb Barchoff who had yielded to his father's request and had temporarily (he thought) foresaken a law career to assist in running the business. But then, as the stocks melted into the war effort, young Barchoff appreciated the wisdom of his father's inventory policies.

Wins NPA Slot

Copper and brass shortages developed, of course, and the large inventories of these metals lying in the sheds of consumer goods manufacturers were frozen there by government decree. To free them, Herbert Barchoff devised the basic plan for the Government's Copper Recovery Corp. It soon channeled this metal into the war effort and, as a result, Herb Barchoff was appointed to the Industry Advisory Committee of the National Production Authority. Eastern played an important part in converting the freed metal to sizes and shapes needed by military equipment manufacturers.

When the war was over, Eastern returned to copper and brass warehousing, stocking large quantities of the metals and performing the usual slitting, embossing, and shearing services for a large number of "small order" customers. Postwar business caused the firm to outgrow its 12,500 square feet on Spring Street, so in 1946 it moved into 40,000 square feet on two floors in the Bronx

■ *After the coil is slit to desired width, Eastern may emboss it with one of some 200 designs. The firm has its roots in manufacturing, knows all there is to know about the distributors' problems, is now a full-fledge sheet roller.*

at 1122 E. 180th St. Two years later they added 10,000 square feet on adjacent property; and in 1952 Eastern added 17,000 more in square footage.

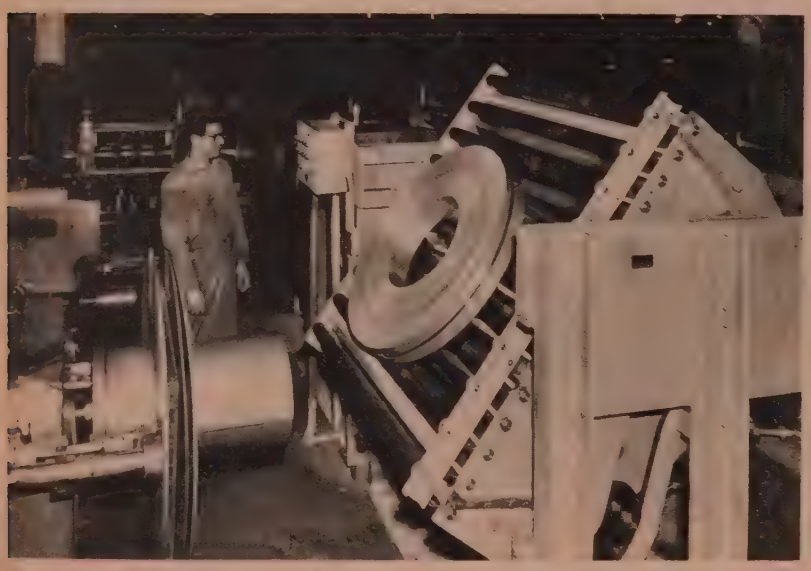
It can be seen that, in the early postwar years, Eastern operated under the warehouse concept, asking and getting a premium price above mill prices because of its specialized local services. It was in this period that the firm became a distributor of Alcoa products

Time for a Change

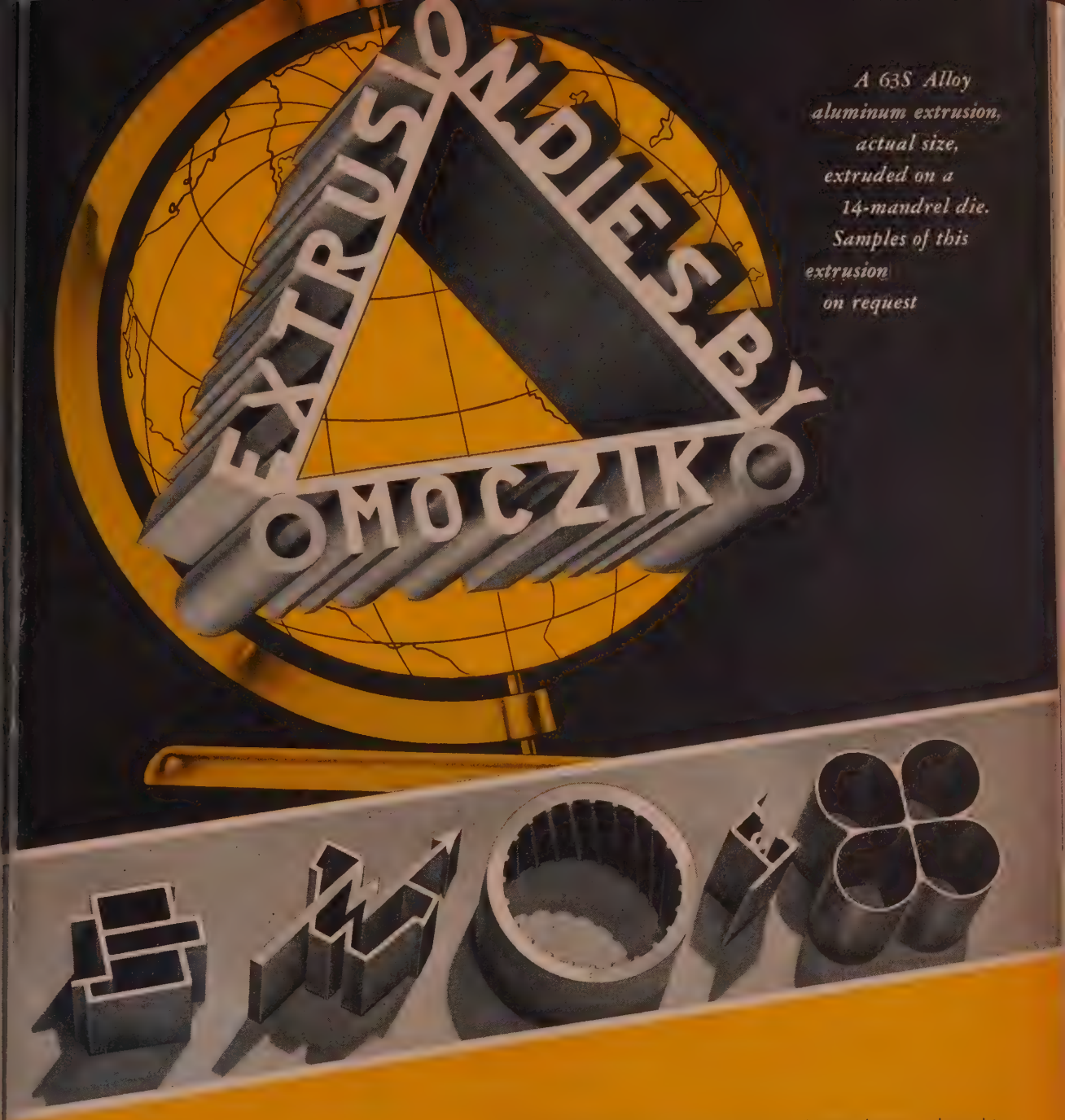
But as the Korean War boom slacked off, shortages ceased, causing the primary producers to go after Eastern's bread and butter, the small customers. At the same time, increasingly competitive conditions caused these small operators to view more tolerantly the extended delivery dates of the big producers because of the cheaper mill prices. Obviously, Barchoff decided, the time had come to change the concept of Eastern from a warehouse to a mill. The company had, since 1954, been operating a 4-hi rolling mill, an annealing furnace, and a battery of eight slitters. The company would resign the Alcoa distributorship, but keep the warehouse service concept; charge the low mill prices and keep the competitive edge through precision operations.

In 1956, the company changed its name to Eastern Rolling Mills and committed itself to finding profit entirely through efficiency in its own operations. Its new ultra-modern rolling mill and the salutary achievements of Eastern's home-designed auxiliary equipment promise success for this concept.

Eastern's sales force of six field men and a sales manager are supplemented by Herbert Barchoff's own sales effort. He believes that Eastern products reach



■ *Eastern's newest slitter is equipped with this take-up and turn-over device which employs electronic controls to remove the banded coils automatically from the take-up drum and place them on a conveyor which travels to the shipping platform.*



A 63S Alloy aluminum extrusion, actual size, extruded on a 14-mandrel die. Samples of this extrusion on request

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"We started rolling our own aluminum in 1954," Barchoff said, "and because of the concurrence of an expanding aluminum market plus the special combination of services which we have to offer, aluminum now represents approximately 60% of our over-all sales.

"While we are gearing ourselves for growth in our other areas of operation, the brass and copper alloys, specialty cold rolled sheets and strip steel, and outside toll work on customers' material, our realistic prognosis is that within a year aluminum should represent about 75% of our total dollar volume."

Growing in Aluminum

Ever since Eastern "sampled up" $189 worth of aluminum in June, 1954, the firm has shown a consistent and rapid increase in its consumption of the light metal.

"There were occasional plateaus," Barchoff recalls, "but we are now producing approximately five million pounds per year. With our new equipment, our present goal is a million pounds a month by 1960."

As a business man who has made a hobby of economics, Barchoff views the immediate future warily.

"I dislike broad predictions which are usually vague generalities," he said. "Barring the horrible disaster of even a limited war, I do not think the present up-turn is a basic one.

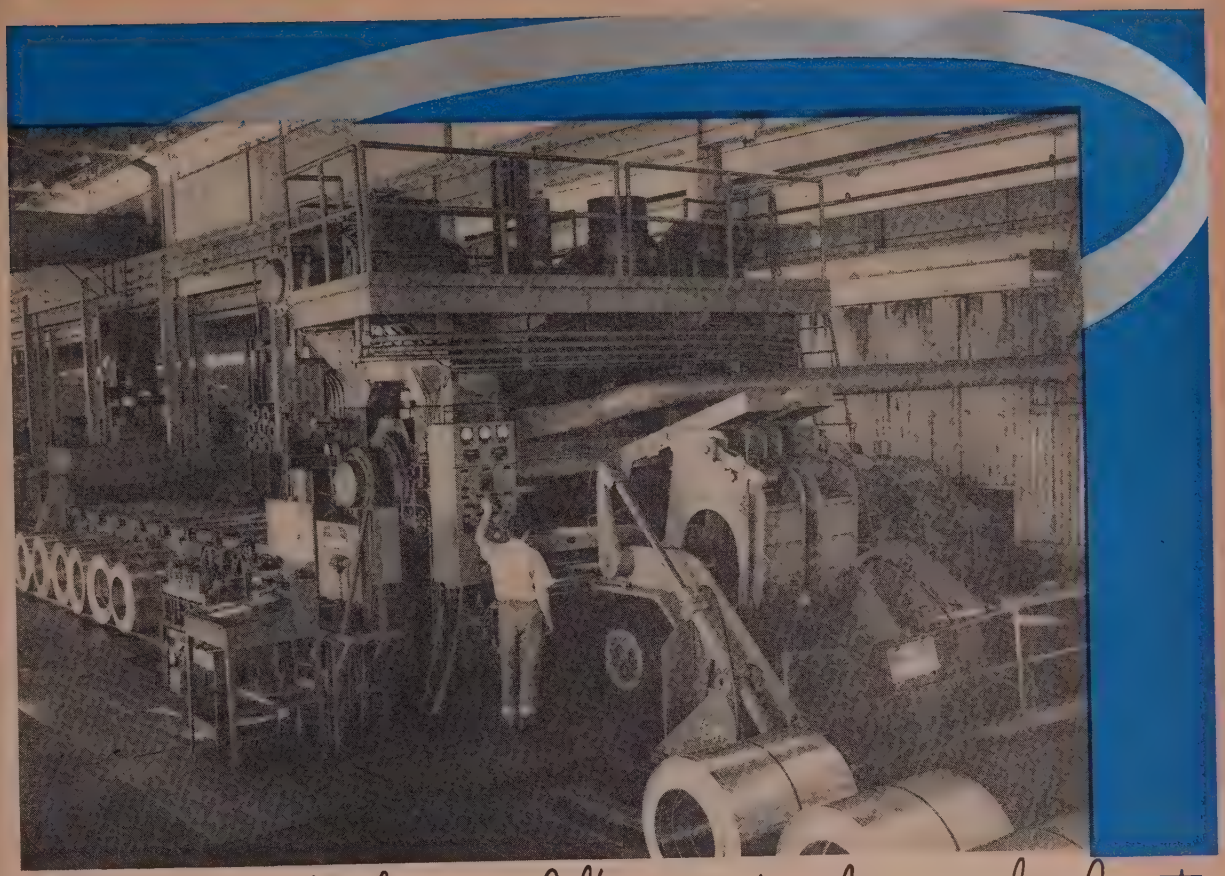
"The economy should be moderately good for the next three years, accompanied by minor down-turns. We cannot even discount the possibility of another serious recession during the next three years. However, in approximately that time we should be on another strong boom that will encompass most facets of our economy."

Meanwhile, Eastern Rolling Mills' million-pounds-a-month goal is being strived for, with little doubt on anyone's part that it will be achieved.

Ahead: The Big Test

"At that time," Barchoff said, "we should be ready with our next development: A completely new plant with even wider and faster equipment than we are presently using."

But along with such an expansion, Eastern Rolling Mills will be challenged in skirting the pitfalls of big order competition. Too much expansion could cause the firm to outgrow "small" customers, throw it more in competition with the primary producers. Regardless of past experience, tilting with the giants would be the acid test.



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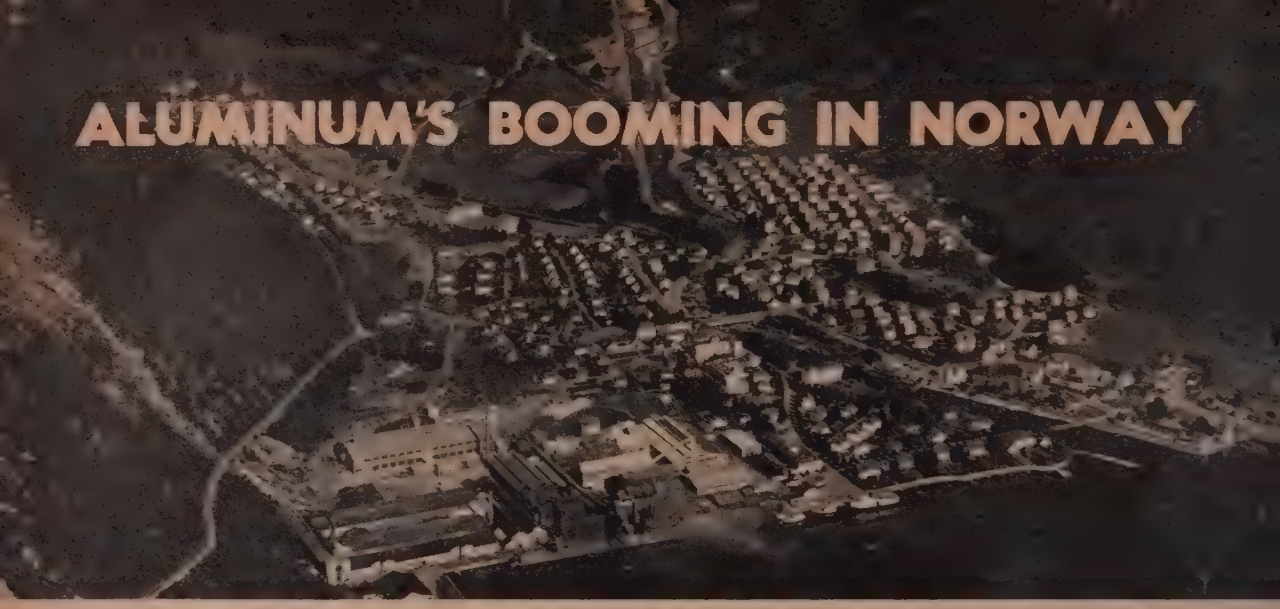
ALUMINUM'S BOOMING IN NORWAY



Norway's primary aluminum output rose 25% last year to a record high of 120,000 metric tons; will reach 215,000 tons by 1965. Most of the country's aluminum is exported, but domestic use is on the rise. Important Norwegian aluminum industry developments are described here . . .

by Johan Murer, Managing Director, Aktieselskapet Norsk Aluminium Company.

PRODUCTION of primary aluminum in Norway in 1958 totaled about 120,000 metric tons — a new record, and 25% above the 96,000 tons produced in 1957. The increase was due primarily to a new 22,000-ton-per-year smelter of Mosjoen Aluminium A/S which began production during 1958.

Furthermore, Aktieselskapet Norsk Aluminum Co. started its new addition at Hoyanger (shown above), thereby increasing total capacity by 4500 tons to 13,000. Present projects within the Norwegian aluminum industry, especially those of the state-owned company of A/S Ardal og Sunndal Verk, will mean considerably expanded capacity in the future. By 1965 total production is expected to be approximately 215,000 tons of primary aluminum.

National consumption of aluminum ingot is modest. The greater part of the production is exported and has become an important source of foreign currencies. With this year's record production, exports also show a new record. Most exports go to countries in Europe. Negotiations concerning a European free-trade-area and the status of aluminum in this area are therefore being watched with great interest.

On the international market, Norway is the second largest exporter of primary aluminum, next to Canada. Outlook for 1959 is good for the Norwegian aluminum primary and semis industries, though strong competition is expected.

With her rich, dependable water power resources, Norway offers an excellent basis for modern power consuming electro-chemical and electro-metallurgical industries, such as the production of aluminum. The country's water power resources represent 20 million kw, of which only about 4 million have been harnessed.

Total power production now runs about 26,000 million kwh annually, of which more than one-third is consumed by electro-chemical and electro-metallurgical industries. Electric power production in 1957 was at a rate of 7500 kwh per capita, which is higher than any other country in the world.

Cheap electric power is the only ingredient Norway possesses for production of aluminum. All other raw materials have to be imported from abroad.

Five Producers Now

At the outbreak of war in 1939 there were six producers of aluminum in Norway, two of those have since closed down. Present producers are:

Aktieselskapet Norsk Aluminium Co.
Det Norske Nitridaktieselskap.
Mosjoen Aluminium A/S.
A/S Vigeland Brug.
A/S Ardal og Sunndal Verk.

A/S Vigeland Brug, Norway's first producer, started production at its Vigeland plant near Kristiansand S. in the southern part of Norway in 1908. Prior to World War II the capacity of the plant was 3400 metric tons annually. After the war the company discontinued regular smelter production and installed refining cells with an annual capacity of about 2500 metric tons of super purity aluminum (minimum purity 99.99%). The plant is owned by the British Aluminium Company.

Det Norske started production at its Eydehavn plant in southern Norway in 1914. Originally, the plant was designed for the production of aluminum nitride, but with the coming of World War I and the increased demand for aluminum, production facilities were altered to produce metal.

Capacity of the Eydehavn smelter is about 9000 metric tons per year. Alumina is imported; electric power is supplied by a local independent plant.

Det Norske also owns and operates a smelter at Tyssedal in western Norway. The plant has recently been extensively modernized, and has a capacity of 17,000 tons per year. Alumina is imported; electric power is supplied by a local plant partly owned by Det Norske.

Det Norske's production is exported. The British Aluminium Co. and Aluminium Limited, Canada, each owns one-half of the stock of the company.

Aktieselskapet Norsk Aluminium Co. was established in 1915 to produce aluminum, using electric power from the waterfalls at Hoyanger in western Norway. Annual capacity of the smelter today is 13,500 tons of metal, including just completed 4500 tons of additional capacity. The raw metal is shipped to the company's fabricating subsidiary at Holmestrand in eastern Norway.

Alumina is supplied by the company's own alumina plant, which is based on the Pedersen method, originally conceived by the late Norwegian professor Harald Pedersen and further developed by the company's own technical staff. A by-product of this process is high grade electro pig iron. Annual produc-

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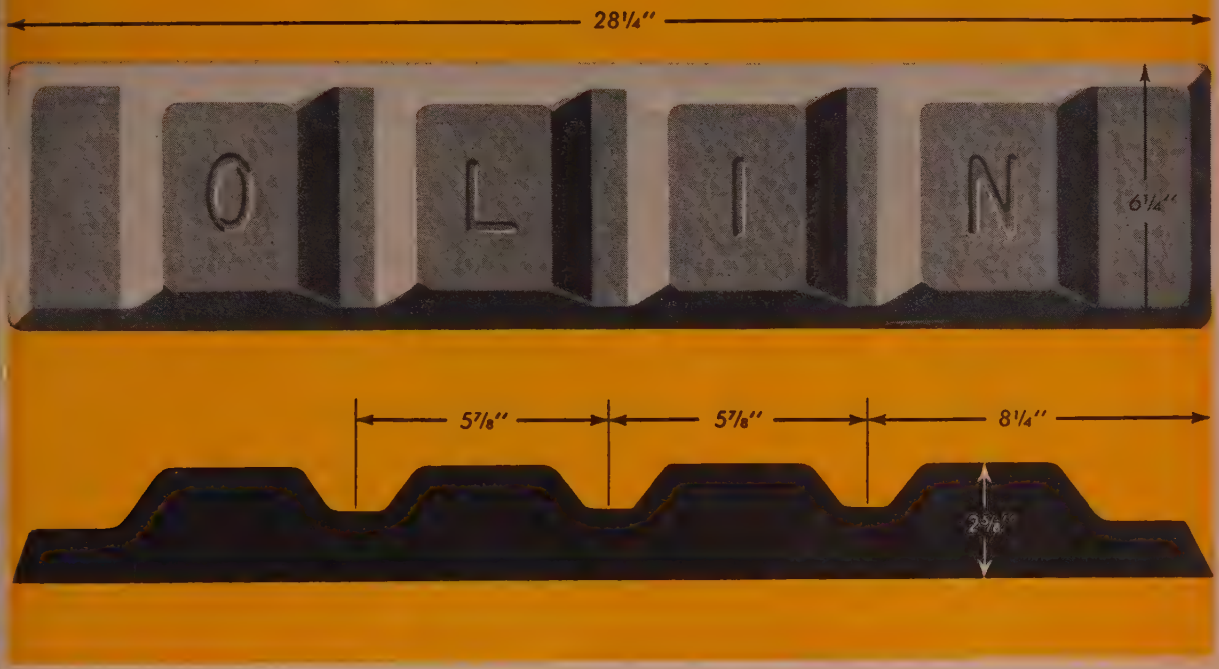

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■ *The Sunndalsora smelter of the state-owned A/S Ardal og Sunndal Verk, Norway's largest aluminum producer, was completed in 1954 and uses alumina supplied by Aluminium Union Limited. Nearly all of its output is exported.*

tion of the alumina plant is approximately 18,000 tons of alumina and 5-6000 tons of pig iron.

Aktieselskapet Norsk is the only Norwegian aluminum firm that also produces alumina. Electric power is supplied by the company's own plants.

The Hovanger smelter and its subsidiary and auxiliary facilities have been modernized and expanded to keep up with modern methods and processes. Ownership of the company is divided on a 50/50 basis between Aluminium Limited, Canada, and a Norwegian group, De Norske Naco-Aktier A/S.

A subsidiary company, A/S Nordisk Aluminiumindustri, operates rolling mill and manufacturing facilities at Holmestrand, in eastern Norway. This subsidiary was established in 1917, and until World War II, its capacity was very modest. Great expansion projects have increased capacity of the rolling mill to about 15,000 tons per year.

The plant is equipped with modern facilities for producing plate, sheet, strip, cables, castings, containers and tanks, building products, architectural specialties, kitchen utensils, foil, hospital and dairy articles, slugs for tubes, and anodized and lacquered aluminum strip for cans, bottle caps, etc.

Strip Anodized for Cans

The production of strip for cans deserves special mention. As far back as the 1920's the company started working on problems connected with aluminum for canning. In 1937 a method was developed for continuously anodizing strip —a pioneering job in this field. The company's continuous strip anodizing units started operations in 1939. Great improvements have been made since, and coiled strip is now supplied to the can making industry.

Approximately 35% of the flat rolled products from Holmestrand is exported. The major part of exports goes to the other Scandinavian countries, but the company is gaining in other areas.

For the promotion of consumption of aluminum in Norway, A/S Nordisk has played a part, the importance of which can hardly be overestimated. Among Norwegian housewives, for example, the trademark of HOYANG is almost synonymous with kitchenware.

In the dairy industry aluminum has gained wide usage for tanks and containers, and on farms aluminum milk cans long ago supplanted the steel cans. Aluminum is constantly gaining ground in canning, following the pioneering work of treating aluminum strip.

In the electrical field the company has promoted considerable usage of aluminum transmission lines. In shipbuilding the company has, to a large extent, pioneered use of aluminum. For example, the M/S "Bergensfjord" features an all-aluminum superstructure, which has gained wide interest. In transportation aluminum is important in streetcars, railway cars and buses.

Per capita consumption of aluminum in Norway was approximately 3 pounds in 1956. It is now 9 pounds, while in Sweden it is 11 pounds, and in Denmark it is 4 pounds.

Besides production facilities in Hoyanger, Aktieselskapet Norsk also owns Dansk Aluminium Industri A/S, operating an aluminum fabricating plant in Copenhagen. Capacity of the plant is about 650 tons of dairy articles, tanks, containers and kitchenware per year.

Norway's largest aluminum producer is the State-owned A/S Ardal og Sunndal Verk. The company owns and operates a 28,000-ton-per-year aluminum smelter at Upper Ardal and a 40,000-ton plant at Sunndalsora. The Ardal smelter started production in 1948. Alumina is furnished by Aluminium Union Limited, Canada, in exchange for aluminum metal. Power is furnished by the company's own power plant.

The Sunndalsora smelter was completed in 1954. Alumina is supplied by Aluminium Union Limited in return for metal. Electric power is supplied by a local, State-owned plant. Almost the entire production of A/S Ardal og Sunndal Verk—68,000 tons—is exported.

The State-owned company has under construction at Ardal new production facilities, Ardal II, which represent an increase of 36,000 tons of aluminum annually, and are scheduled to be completed by the end of 1959. Alumina is to be supplied by the Aluminum Co. of America in return for aluminum metal. Power will be furnished by the company's own power plant.

Another expansion project, Ardal III, presumably to be realized when Ardal II has been completed, will gradually add another 32,000 tons of capacity between 1963 and 1965. Alumina will be supplied by Aluminium Union Limited, in return for metal. Power will be furnished by the company's own plant.

For Sunndalsora there are plans to install electrolytic cells representing an additional 10,000 tons of aluminum per year. By 1960 total capacity of A/S Ardal og Sunndal Verk's smelter will be 115,000 tons. By 1965 another 32,000 tons will be added.

The company was originally established in 1946 as A/S Ardal Verk, to take over and utilize a major part of the assets of A/S Nordag, which the Germans had started during the occupation of Norway. The greater part of those assets were located in the valley of Ardal, Lower Ardal and Upper Ardal.

The Germans had planned to produce aluminum at Upper Ardal, based on electric power to be furnished by a power plant also located at Upper Ardal, and on alumina to be produced in a plant at Lower Ardal.

Mosjoen Aluminium A/S started production at its Mosjoen smelter in northern Norway in 1958. Capacity of the smelter is 22,000 tons. Alumina is imported, and electric power is supplied by a State-owned power plant.

The Mosjoen smelter is owned by Elektrokemisk A/S and the Swiss company Aluminium-Industrie-Aktien-Gesellschaft on a 2/3 - 1/3 basis.

600% Increase by 1960

Upon completion of present expansion projects, Norway's total production capacity for virgin aluminum will be 175,000 tons per year by 1960, representing an increase of approximately 600% compared to pre-war capacity of about 30,000 tons.

For Norway, this progressive aluminum industry means employment for thousands of people and a valuable contribution to the economic prosperity of the country. Total value of the marketed aluminum ingots, semis, and finished products in 1957 ran about $55 million. Exports in 1957 meant foreign currencies representing $44 million for the Treasury.

WEATHER-RESISTANT BUTYRATE LACQUERS PRESERVE THE NATURAL BEAUTY OF ALUMINUM

Butyrate lacquers provide clear, weather-resistant coatings that won't yellow, even under prolonged exposure to sunlight. They have high strength and flexibility ...withstand oxidation and discoloring...and are little affected by salt spray or rapid temperature changes.

When outdoor aluminum surfaces are protected with Butyrate lacquers, cleaning and maintenance costs are at a minimum. Usually, the action of rain itself is enough to keep aluminum surfaces clean.

This combination of features makes Butyrate lacquers particularly advantageous for use on aluminum curtain walls, siding, spandrels, louvers, solar canopies and architectural trim and hardware.

Butyrate lacquers are easy to spray on, economical to use. A single coat provides excellent protection. They are available from lacquer manufacturers in all parts of the country.

An informative 15-minute 16mm. sound color film has been produced especially for viewing by those who design in or specify aluminum in an outdoor application. Would you like to see it? See below.

The aluminum exterior of the American Sterilizer Company plant at Erie, Pennsylvania, is protected against weather and oxidation with a clear, colorless Butyrate lacquer.

The finest lacquers for aluminum are made with

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ALUMINUM FABRICATORS

HERE'S HOW TO GET the complete story on this new method of preserving exterior aluminum.
1) Send for Eastman's catalog on Butyrate lacquer. It tells you where this new protective coating has proved particularly successful and why these lacquers are so effective in preserving aluminum surfaces.
2) Check Sweet's Industrial Construction File, Sweet's Architectural File, or see 15-M of the A. I. A. Alphabetical Filing System for specification details.
3) Send for sound color film. Please indicate the date you plan to show the film and an alternate date.
4) Write for names of manufacturers of Butyrate lacquer.

MASS PRODUCTION BRAZING MACHINE . . . attaches spouts to aluminum coffee pots at rates of 300 to 400 units per manhour; eliminates costly grinding and polishing steps; occupies under 225 sq. ft. of floor space.

RETAILING aluminum cookware has never been more competitive than it is today. This means that manufacturing operations must be studied constantly for ways to keep costs down so that moderate prices can be maintained without sacrifices in product quality.

The change from a welded to a brazed joint in the production of aluminum coffee pots at Alcoa's Cooking Utensil Division has effected just such an economy and has resulted in a better product at the same time. This was made possible by the development of a special brazing machine by Selas Corp. of America, Dresher, Pa. The installation has virtually eliminated a costly grinding operation. Handling economies are also achieved.

Typical of the operations significant to manufacturing cost and quality of the finished product is the joining of the pouring spout to the body of the coffee maker. In the past, this part was joined by oxy-hydrogen welding. Although this operation produced a joint of high quality and durability — making the spout, in effect, an integral part of the body — a considerable amount of weld material had to be removed in order to produce an attractive fillet. This excess material was removed by grinding and the surface then smoothed by polishing. These finishing operations added considerably to the unit manufacturing cost, an important factor in the sale of cooking ware.

Alcoa engineers felt that this expensive grinding operation could be substantially reduced by brazing the joint, as shown in Fig. 1. Aluminum brazing produces a smooth uniform fillet of a material very similar in appearance and other characteristics to the parent metal. The flux used can be removed by washing and, if the joint is well brazed, the part may be finished by light buffing.

Hand Brazing Impractical

Hand brazing this joint would have been impractical because of the high production volume desired. Since there is less than 100° F temperature difference between the float point of the filler alloy and the melting point of the parent metal, hand brazing was more likely to produce non-uniformities. Inspection and finishing costs would, accordingly, be higher.

Automatic brazing, which gives closer control over brazing heat, seemed to provide a better solution. Alcoa contacted Selas Corp., an engineering company that had been successful in designing automatic brazing machines for several customers of Alcoa's metal-producing divisions.

Samples of the parts to be brazed were sent to the Selas Process and Development Laboratory to determine whether this joint could be brazed uniformly and consistently by automatic machinery. Test runs on laboratory equipment demonstrated that reasonable times and other factors could be established for machine brazing.

Upon receiving approval from the Alcoa engineering and production department, Selas designed and built the automatic brazing machine shown in Fig. 2. Now, one man without special training can produce consistently good quality brazes on the production of thousands of coffee pots per month. The operator works at a low fatigue level and under good working conditions. The machine and an accompanying Selas gas combustion controller take up less than a 15 x 15 ft. floor area. Spouts are now brazed right in the production line, thereby saving on handling with its related handling damages.

The Selas automatic machine achieves reproducible uniform results by (a) stabilizing combustion, and thereby stabilizing heat release, (b) providing a fixed distance and relative position between burners and workpiece, and (c) providing a fixed heating time.

The machine has an indexing dial with fixtures designed by Alcoa to support the pot body and hold the spout in the correct location. The workpiece is indexed past loading, heating and unloading stations.

Each heating station is equipped with flame type burners equipped with ceramic flame screens. These Selas PR type burners produce a flame of consistent characteristics.

These burners are supplied by a con-

(Continued on page 53)

■ *Fig. 1. One of the several coffee-maker assemblies brazed on the Selas automatic brazing machine. Note smooth, uniform fillet obtained without buffing or other finishing operations.*

A NEW ERA IN

CONTROLLED COLORS

FOR ALUMINUM

BY FERRO

MATCHED PERMANENT COLOR

gets off the ground in a big way...

Photo—Aluminum Company of America

Spectrum-matched controlled colors take the last variable out of porcelain enamel on aluminum

What comes out of Ferro laboratories is well known for setting the pace in porcelain enameling — and Ferro's new controls give you perfectly matched, predictable colors for aluminum.

Ferro technicians now make it easier for aluminum fabricators and enamelers to assure their customers of uniform colors on production runs — and to simplify color-matching problems.

This is possible only because a new Ferro aluminum porcelain color laboratory checks *all* colors that Ferro produces, against established standards, for uniformity under production conditions. This laboratory also carefully and accurately matches special color samples for customers — provides blending formulas that will stand up in production. This, of course, speeds up production and prevents color drift.

Ferro's skilled technicians — Ferro's complete range of expensive color-matching equipment — Ferro's

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Good looks? You bet! New American Airlines Hangar at Metropolitan Wayne County Airport, Detroit. Aluminum porcelain-enamel curtain walls supply the color! *Architect:* Giffels and Rossetti, Inc., Detroit, Mich. *Porcelain Enameler:* Porce-Alume, Alliance, Ohio.

physicists, chemists and ceramic engineers — are all at your service to help you solve any problems you have in aluminum porcelain enamels.

And because Ferro produces both frit *and* color, the mill additions you are supplied with will work. You will have fewer color-matching headaches. You will have fewer culls caused by off-color enamels on aluminum.

If you want the ultimate in colors for aluminum, get in touch with us.

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Careful color-blending of Ferro production colors. Under this scientific system a dozen formulas can be checked at once.

Ferro color formulas are visually checked under daylight and artificial lighting. They must match under both.

Color-difference meter registers small color variations not visible to the eye. Each formula is color-corrected to perfection.

Now— predictable porcelain enamels for aluminum

Better frits—better mill formulas —easier application—all lead to more consistent results.

Ferro's new "flake" frit has greater uniformity, and is far simpler to handle in production.

Continuous smelting and roll-quenching — a Ferro-developed process — maintains desired qualities consistently.

"Flake" frit produces enamels easier to hold in suspension in the slip stage. They hold up well in storage — reduce problems frequently caused by "aging" of milled enamels.

Ferro research has also developed new techniques for using new types of mill-addition agents. Dry agents, such as sodium silicate, boric acid, and certain *wet* agents, provide greater flexibility and accuracy in tailoring enamels for specific aluminum applications: overcoming local plant problems: holding colors constant in production.

The new "flakes" are now in production. New enamels have been thoroughly tested, and are ready to go. New techniques are in the hands of field servicemen, ready to go to work for you.

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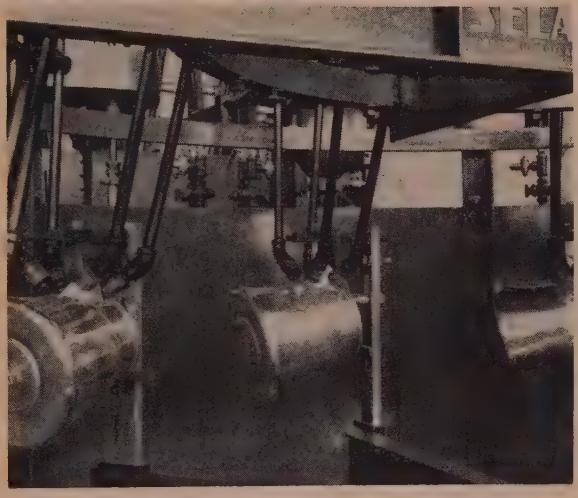
■ *Fig 2, left. Brazing coffee - maker spouts to bodies with automatic gas-fired machine at Alcoa's Chillicothe, Ohio, plant.*



■ *Fig. 3, right. Closeup of three of the heating stations, showing typical burner arrangement. Burners produce a flame of consistent characteristics.*

trolled mixture of propane gas with room air. Mixture is supplied by the gas combustion controller which is set to the desired gas-air ratio, and then maintains that ratio regardless of wide variations in mixture demand.

Record Burner Settings

The burners are adjusted to provide the exact heating conditions for each of the several sizes of drip and percolator coffee makers brazed on this machine, and the valve for each burner is set to produce the optimum burner pressure. These settings are recorded and can be duplicated for any repeat of the same job, once they are established by a few trial runs.

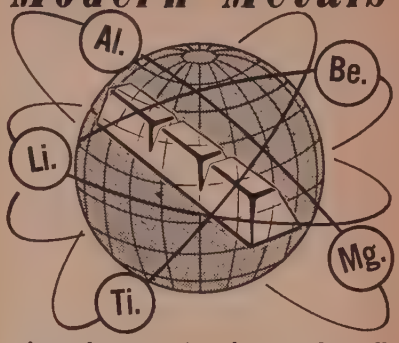
The brazing machine is placed in the production area adjacent to the machine which broaches the spouts. Since the spouts are broached as needed, there is no backlog of parts. Thus the spout does not remain exposed in air long enough for an appreciable layer of oxide to form on the cut surface, so that less cleaning and fluxing is required.

A supply of pots is brought to the brazing machine and stacked on a small table to the operator's left. Spouts are placed in a container near the electrical controls at the top of the front of the machine and preformed lengths of brazing wire are placed in a glass container along with flux in front of and to the right of the operator. The operator places the pot body on a fixture, places the fluxed brazing wire in position, places the spout on the pot body and closes the fixture to hold the components in place. After the pot has been brazed, the fixture is opened and the operator removes the pot from the fixture and places it on a conveyor at his right.

The coffee maker is subsequently washed to remove the small amount of flux remaining in the spout, and the body is finished by a light buffing.

With the Selas automatic brazing machine, one worker turns out 300 to 400 brazed coffee-maker bodies per hour with a negligible number of rejects. Fillets are clean and uniform, without grinding, providing a product of good appearance and durability. The brazing operation is clean and simple, contributing to good worker morale and involves little extra handling since the machine is right in the production line.

Modern Metals



The only magazine that reaches all 7,000 plants that produce, fabricate and cast aluminum, magnesium, titanium, beryllium and lithium . . . plus some 18,000 plants that use these metals in manufacturing end products.

MODERN METALS provides profitable, low-cost penetration ($280.00 per page) of the light metals industry—some 25,000 metalworking and manufacturing plants that regularly buy:

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Anodizing materials & equipment
Billet, ingot & flux
Castings, forgings
Extrusions, tube
Coatings, cleaners, etchants, finishes
Lubricants, refractories
Plate, sheet, coil, rod,
Bar, wire & foil
Structurals, shapes
Welding wire, solder

EQUIPMENT AND SERVICES

Anodizing & enameling
Fabricating & casting
Fasteners & screws
Rolling mills & presses
Cut-off machines
Extrusion & forging presses
Die casting machines
Welding equipment
Extrusion & die casting dies
Processing machinery
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Straighteners, stretchers
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Read in companies that produce, fabricate and cast aluminum, magnesium and titanium, and firms that use these metals in manufacturing end products.

BIG SMELTER

AT ALTON NOW PRODUCING ALUMINUM INGOT

THE LARGEST smelter ever built specifically for transforming aluminum scrap into alloy ingot is now in volume production at Alton, Ill. Built by American Smelting & Refining Co., the plant has a production capacity of 72,000,000 pounds of aluminum ingot annually, and is the result of extensive technical research and marketing studies conducted by Asarco over the past several years, according to George M. Baumann, plant manager.

"Increasing uses for aluminum alloys, coupled with a growing demand for technical information and services, clearly indicated that existing facilities would soon be inadequate," Baumann said. "Therefore, we have also expanded our sales and service organizations. Already we can point to definite improvement in both the production and the marketing of aluminum alloys to a broad section of the market."

The Alton plant's primary marketing area is the midwest, including the Detroit-Chicago-Cleveland automotive and heavy industrial areas, which are served by field warehouses at Detroit and Whiting, Ind. Stocks are also maintained at Houston, Texas, to assure prompt deliveries to southwest industry. Supporting the field warehouses is the large inventory of alloys maintained at Alton, which, Asarco reports, assures 24-hour service to most midwestern cities.

"To supply adequate inventories of alloy ingot and to assure a steady production rate, the Alton plant maintains a 60-90 day supply of aluminum scrap, most of which is obtained from the midwest industries it serves," Baumann explained. "In addition, desirable turnings, stampings, borings, and the like are obtained from heavy industry sources in Seattle and other west coast terminals."

Incoming scrap is received at unloading platforms which can accommodate seven railroad cars and 12 trucks simultaneously. Nine mobile loaders transport scrap to storage areas.

Scrap entering the production cycle is sorted and transported in 2400 large tote boxes, which are moved from process to process by a fleet of 14 fork lift trucks, each equipped with short wave radio receivers and controlled from a central radio dispatch office.

High speed conveyor belts transport scrap through crushing, sorting and cleaning processes, which are almost entirely mechanized. To simplify accurate alloying formulations and assure uniform ingot, special equipment removes contaminants.

Heel System Used

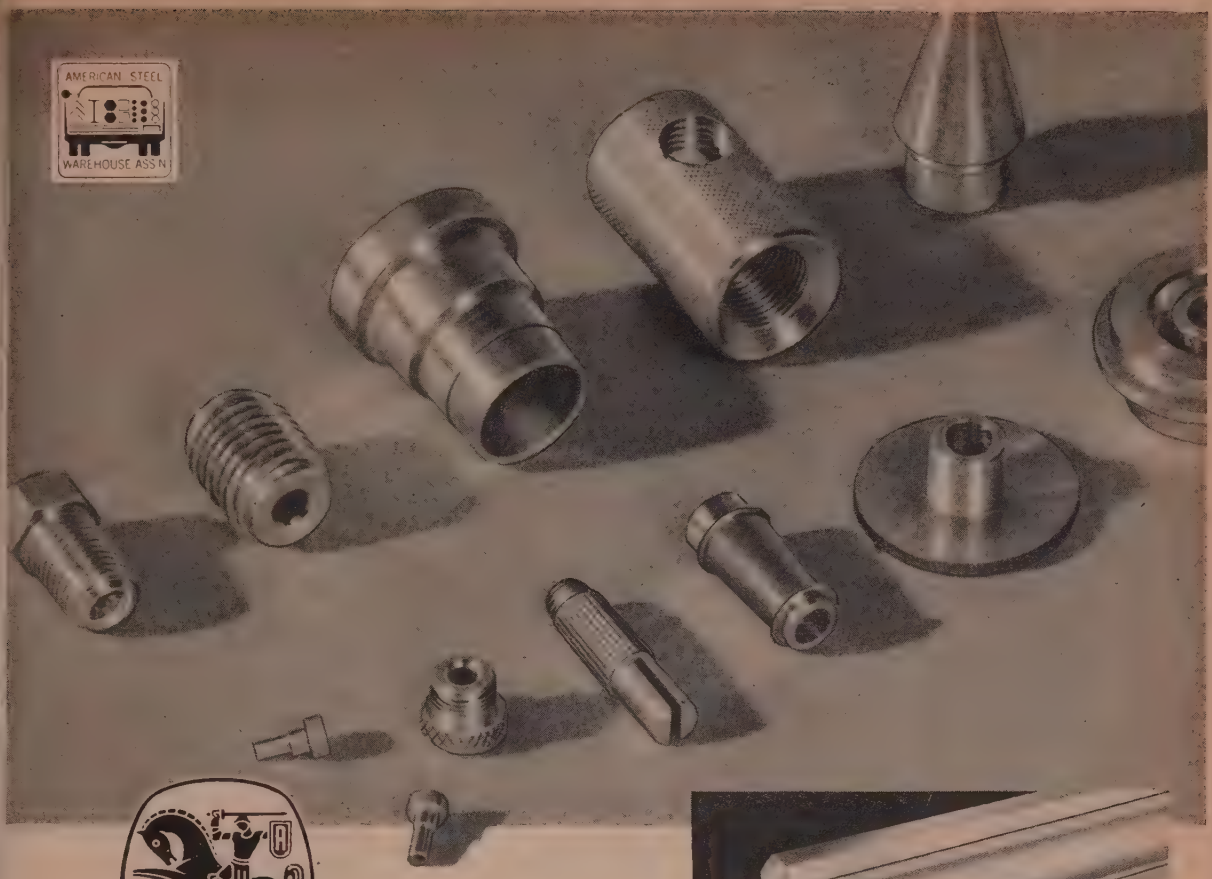
Smelting and alloying operations are handled by four 40-ton and one 15-ton gas-fired reverberatory furnaces, all convertible to oil if required. The heel system of smelting is employed. Special scrubbing equipment removes objectionable fumes and dust from furnace exhaust gases.

Three ingot casting machines (one is pictured) produce 16- and 30-pound ingots with a minimum of oxidation and a high quality of finished appearance. Semi-automatic units stack ingots for immediate shipment or for storage in rooms equipped with temperature and humidity controls.

Quality control is an integral part of production, from scrap handling through pouring operations. At any step in the production cycle a complete analysis of any alloy can be obtained in ten minutes. Routine analyses on furnace melts are taken hourly; as cast out time approaches, analyses are stepped up to 15 minute intervals in many instances.

The new smelter is a steel frame structure. Translucent plastic curtain walls in production areas provide uniform illumination throughout the plant. At the front are brick offices for sales and service personnel and for research and analytical laboratories. Exterior landscaping and maintenance make the plant a desirable addition to Alton.

■ *Ingots of aluminum alloys tumble off one of the three casting lines. Ingots are cast in both 16- and 30-pound units.*



Here's aluminum especially for screw machine work

● For screw machine operations—as well as other machining—specify high-quality aluminum screw machine stock from your J & L Service Center. Because of its special processing, this aluminum gives you more parts per pound, per hour, per machine . . . in addition to longer tool life, smoother machining operations and better surface finishes. You can get this quality aluminum in all sizes of rod and bar from complete inventories carried at your J & L Service Center. Call J & L for prompt delivery of your next aluminum requirements. Take advantage of aluminum that is especially processed for your type of operations.

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GOOD DEGREASER for ALUMINUM

Dow's high boiling point Perchloroethylene Industrial boasts longer cleaning action, penetrates deeply recessed parts, minimizes solvent losses, reduces staining. It's particularly suited to aluminum.

A BOILING point of 250° F., elimination of moisture, and inherent stability are some of the advantages stressed by the Dow Chemical Co. for its vapor degreasing solvent, Perchloroethylene Industrial. According to Dow, the product is particularly suited to aluminum degreasing.

Vapor degreasing is the process of removing oil, grease, and wax from ferrous and non-ferrous metals by placing them into a vat or container in which a chlorinated solvent has been vaporized. As these vapors condense on the cold metal, the fluid condensate dissolves and removes the grease, oil and wax as it drains off the metal. When the surface temperature of the work attains that of the boiling solvent, condensation ceases and cleaning action stops.

"A longer cleaning action is possible with perchloroethylene since it has a boiling point of 250° F. as compared to 189° F. for trichloroethylene," a Dow engineer said.

"This high boiling point is a particular advantage where presence of moisture may prove detrimental to the finish of the work such as in the metal plating industry. Moisture entrapped in porous metals, deeply recessed parts and blind holes can be vaporized (water boils at 212° F.), permitting complete and thorough drying."

Perchloroethylene also has a high solvency for oils, greases, waxes, tars, resins, lubricants and coolants generally found in metal processing industries.

From a safety standpoint perchloroethylene when properly handled offers little hazard from a toxicity viewpoint. The maximum permissible concentration for repeated 8-hour vapor exposure has been set at 200 parts per million by the American Standards Association. The solvent is classified as nonflammable and nonexplosive at ordinary temperatures. It does not produce a flash either by the closed cup or open cup test.

The high vapor density of the solvent minimizes solvent losses during work transfer in the degreaser. Being heavy (approximately 5.7 times the density of air) it tends to stay down in the degreaser. It also has a low evaporation rate which reduces solvent loss.

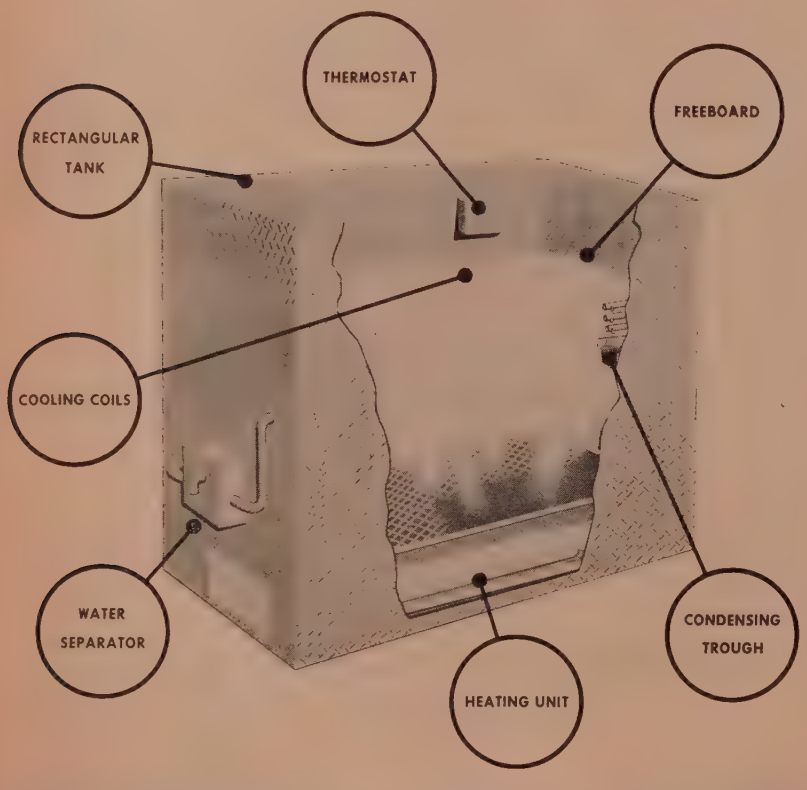
Less Staining

Perchloroethylene also reduces staining of light gauge metals. These rapidly reach the vapor temperature of trichloroethylene, sometimes before sufficient condensing action takes place to dissolve all the oil and rinse away contaminants. The higher boiling point of perchloroethylene permits a longer and more thorough rinsing action.

"There are fewer rejects because it cleans more thoroughly," the Dow executive said.

The above advantages apply equally to all metals including aluminum and other light metals. Perchloroethylene also offers certain distinct advantages for the lighter metals. Stabilized perchloroethylene will not attack steel, copper, brass, zinc, aluminum, magnesium or any alloy that may be found in industry. It leaves the metal clean, bright, dry and ready for any subsequent finishing operation. Nor do repeated cleaning and recovery cycles impair the per solvent's stability and effectiveness, the manufacturer said.

"The chemical composition of perchloroethylene makes it a more stable solvent and more suitable for use with aluminum in particular," Dow said. "Chemically this solvent is fully reacted with chlorine (two double-bonded carbon atoms each with two chlorine atoms) while trichloroethylene has three chlorine atoms and one hydrogen atom. It is believed that the presence of hydrogen in trichloroethylene can cause decomposition under adverse operating



■ *Vapor degreasing equipment of the type required for use with Dow Perchloroethylene Industrial has two basic functions: To clean and dry the work by dissolving all oils, greases, etc., and to reclaim the solvent from the contaminants by distillation.*

Properties of Perchloroethylene Industrial

Boiling point	121.0°C.
Freezing point	−22.4°C.
Specific gravity at 25/25°C.	1.619
Pounds per gallon at 25°C.	13.47
Refractive index at 25°C.	1.503
Viscosity at 25°C., centipoises	0.84
Flash point	None
Fire point	None
Heat of vaporization at b.p.:	
Cal./g.	50.1
BTU/lb.	90.2
Specific heat, cal./g./° C.	0.21

conditions on certain metals."

Aluminum chips or powered aluminum, in particular, can under certain conditions, react in a trichloroethylene degreaser to form aluminum chloride. This has occasionally resulted in severe solvent decomposition. Experimental work done by Dr. Ludwig Metz and Dr. Alfred Roedig (Chemisch-Technische, Reichanstait, Berlin) to study the cause and course of such reactions resulted in their recommendation of perchloroethylene for degreasing aluminum and aluminum alloys.

The inherent stability of perchloroethylene is one factor that has led to its use in the drycleaning industry as a synthetic drycleaning solvent.

The previously listed advantage of moisture elimination is of particular importance in work with aluminum, since the presence of moisture accelerates the breakdown of chlorinated solvents in the presence of aluminum.

Not Widely Used—Yet

Though it was first used in vapor degreasing in the early 1930's, perchloroethylene has not found the wide use enjoyed by trichloroethylene in this field. Both are synthetic or chlorinated hydrocarbon solvents and both were developed around 1920.

The high vapor density of perchloroethylene, actually an advantage from a vapor degreasing standpoint, is probably the chief reason its use did not develop to any great extent until recent years. Early vapor degreasing machines employed steam heat and were generally tailored for use with trichloroethylene, since this solvent was promoted more intensively. Many degreasers could not produce the extra pressure needed for use with perchloroethylene.

Modern degreasers, however, are usually electrically or gas heated and can be easily modified by the simple change of a rheostat or thermostat for use with perchloroethylene. Even the remaining steam-heated degreasers can be modified in this way.

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Even the inexperienced operator can easily produce virtually BURR-FREE results while holding tolerances as close as .001" with the Stanat Slitter. Ease of operation is inherent in these versatile slitters due to the many exclusive Stanat features such as:

- **SINGLE HANDWHEEL SCREWDOWN** — simplifies adjustment of arbor.
- **RECOIL TENSION CONTROL** — can be adjusted while slitter is in operation, to produce tightly wound uniform coils.
- **DUAL SCRAP WINDERS** (One for each trim cut) — simplifies disposal of excess material.
- **CORE PLATE RECOILER** — provides easy removal of tightly wound slit coils without telescoping or unwinding; frequently permits one man operation of entire recoiling line.

Core Plate Being Removed With Finished Coil

Stanat gang slitters are available in a complete range of sizes and capacities. Find out more about these economical slitters today. Write for Bulletin #569.

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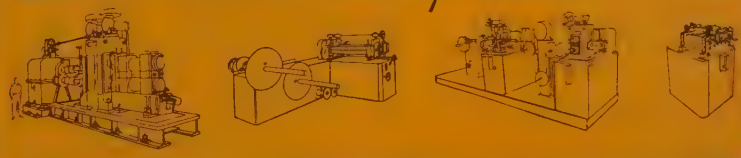
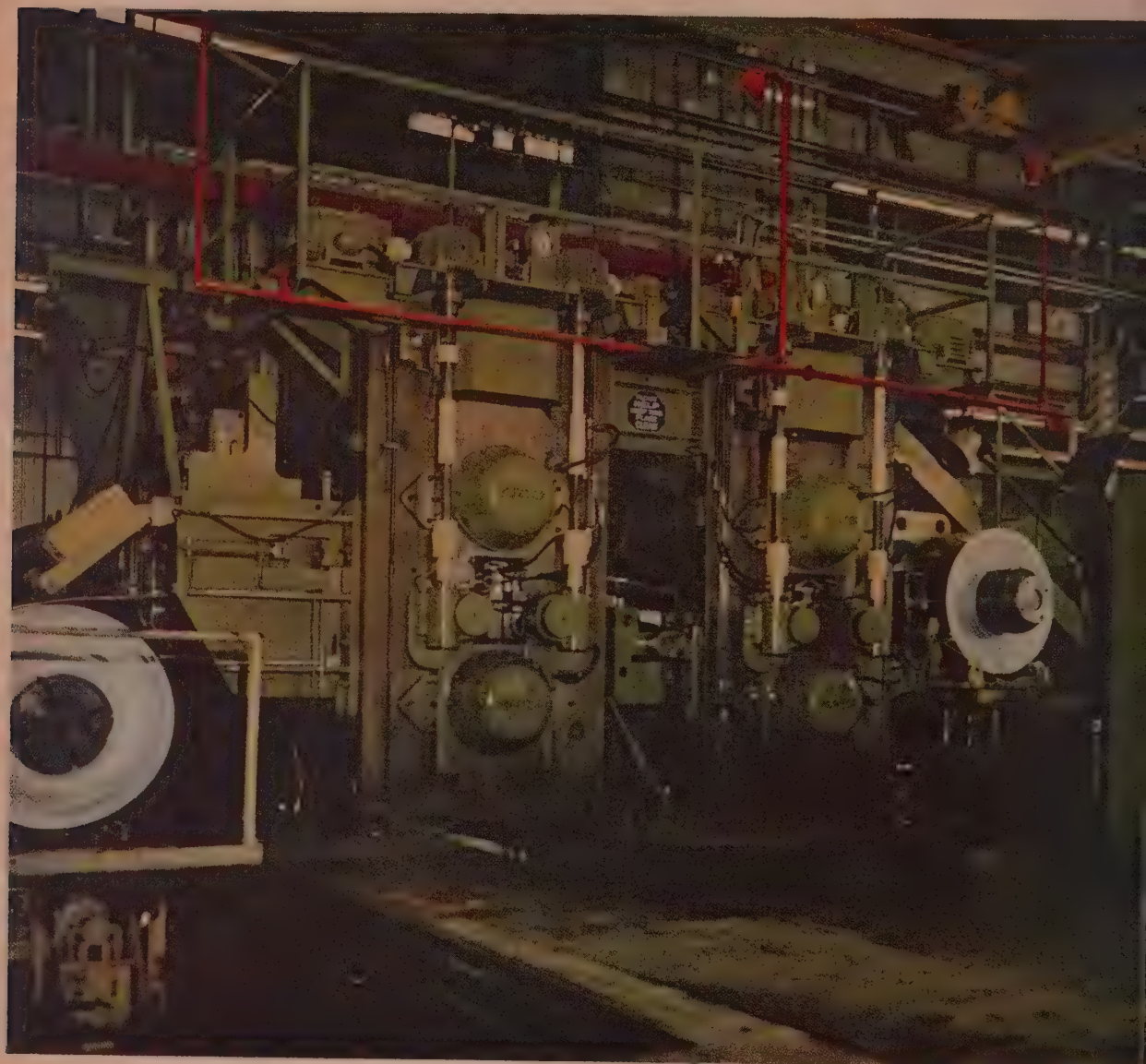


MFR'S OF ROLLING MILLS, GANG SLITTERS, WIRE FLATTENING MILLS, ROLLER LEVELERS AND BULL BLOCKS

To ALUMINUM FABRICATORS



For full information on Hunter Engineering activities in the aluminum industry, see the complete story in the March 1959 MODERN METALS or write to us for a reprint.

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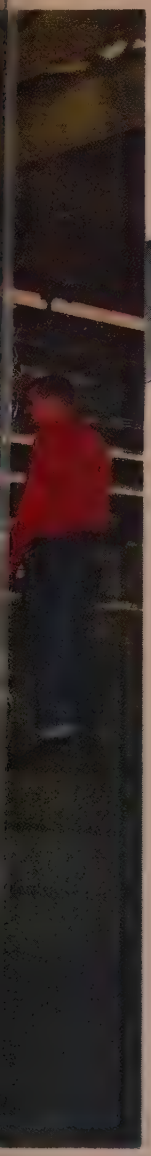

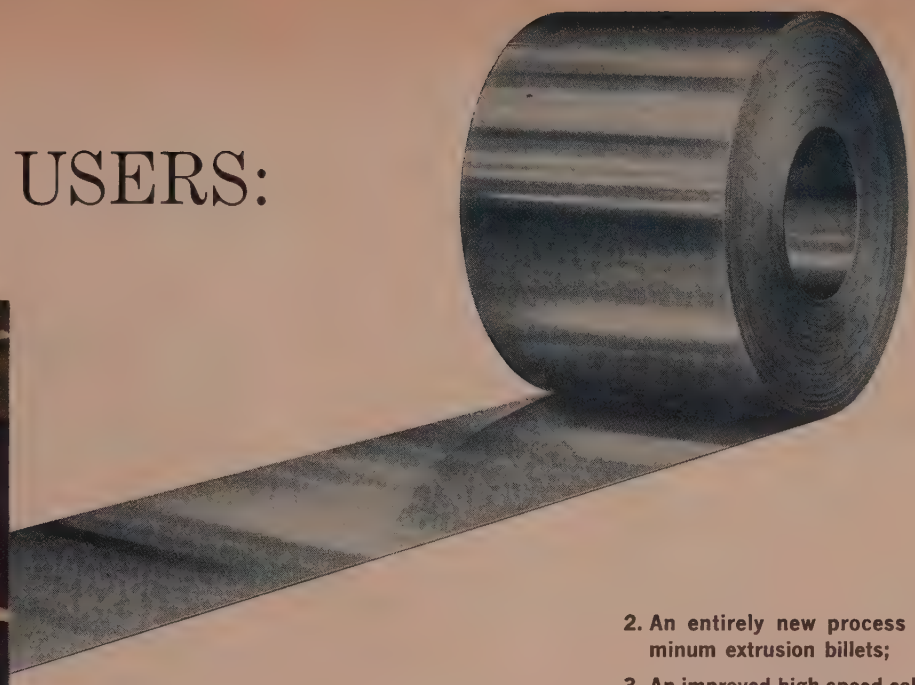

Hunter Engineering Company has a 15-year history of pioneering new and improved processes and machines aimed at the vertical integration of independent aluminum fabricators. Our approach has been to conceive an entire fabricating technique, then develop this concept into a practical production system.

Proving this approach, the original Hunter-developed continuous casting and narrow strip rolling process has now produced well over 200 million pounds of high quality aluminum strip. As a result of a greatly expanded research and engineering program at Hunter Engineering these past four years, *results are now being achieved that are still more significant.*

NEW HUNTER PROCESSES

Some of the new Hunter processes now completed and in practical production include:

1. **The first successful method for continuous casting of wide aluminum sheet (production to date over 25 million pounds);**
2. **An entirely new process for casting aluminum extrusion billets;**
3. **An improved high speed cold extruding technique for producing aluminum irrigation pipe, aluminum rod and bar, and other tubular products.**

Hunter Engineering differs from any other development and machinery company serving aluminum fabricators. *All Hunter equipment is proved on high volume commercial production in our own plant before being released to the industry.*

Hunter Engineering has the experience, the technicians, and the facilities to supply the following services:

Analyze your company's needs;
Engineer a production system tailored to these needs;
Build the equipment in our own plant;
Install the equipment in your plant;
Train your production crew.

We believe that these services are unique in the aluminum industry. Perhaps they can broaden your operations and improve the profit margin of your company.

Sincerely yours,

Joe Hunter

J. L. HUNTER,
President

ALUMINUM PRODUCTS AND PROCESSES

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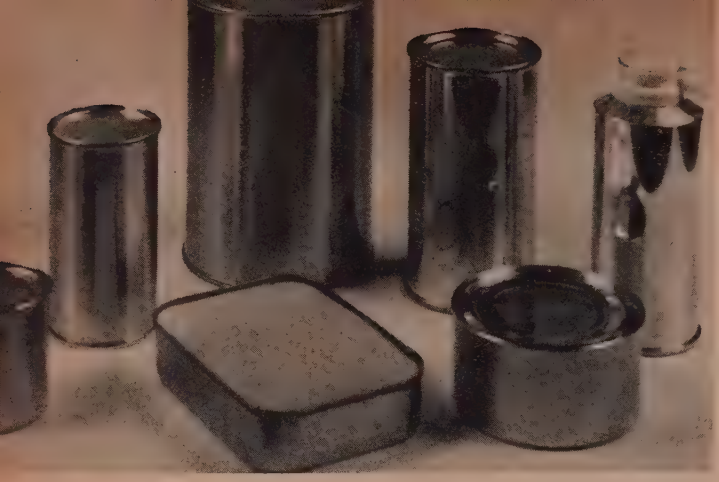


■ *Various types of aluminum containers made by American Can Co.*

BIG OBSTACLES BESET ALUMINUM FOOD CANS

Giant obstacles thwart aluminum's use in volume processed food canning. Canners Association convention paper by American Can Co. technicians sees need for heavier gauges to prevent panelling and buckling of aluminum. Present can making and filling machinery might be too hard on aluminum. The stronger, magnesium-bearing alloys drastically reduce shelf life.

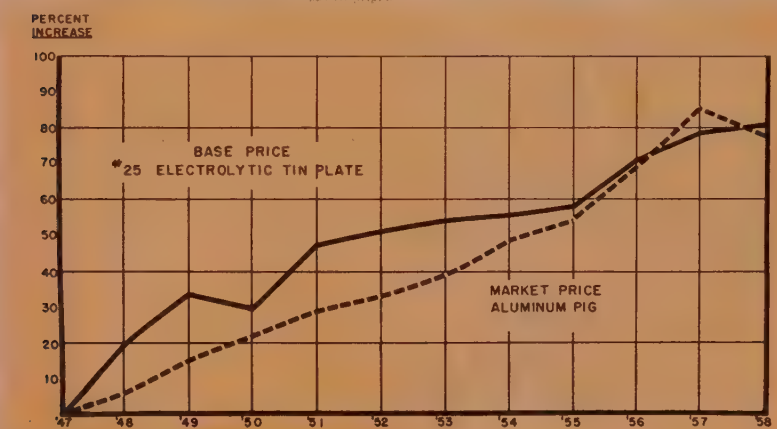
By L. P. Gotsch, E. F. Eike and K. W. Brighton, Research and Technical Department, American Can Co.

ALUMINUM cans have arrived, and there is general agreement that they will find a variety of applications. The question is whether aluminum cans will be used ultimately for the large volume food items.

The quickened interest in aluminum by our company in the last several years has stemmed from the possibility that aluminum would sometime compete price-wise with tin plate for the rigid container market and, most important, provide us with a second major can-making metal.

Since 1947, when aluminum and steel were decontrolled, the price of aluminum pig has risen at about the same rate as the price of tin plate, as shown in Figure 1. However, faced with such a glut of the metal, aluminum producers have recently taken a long look at the can market which currently utilizes about 5,000,000 tons of steel. By projecting a change in their method of operating, from that of a job shop to sustained production runs of plate of one specification, the producers of aluminum have been able to establish a can stock commodity price tied to large volume usage which offers substantial price reductions.

For example, the price of .010 in. thick 5052 alloy, which is one of the alloys suitable for can making, has been reduced from 56.8 cents a pound to 32.0 cents. One of the aluminum producers has also been able to make a special arrangement by which 60 million motor oil cans were supplied at the same price as tin plate cans. And other breakthroughs have been promised.



■ *Fig. 1. Price comparison of aluminum and No. 25 tin plate; 1947 = 100 (first post-war year both metals were decontrolled). The aluminum primary producers are working toward a can stock commodity price which makes the light metal increasingly attractive to can makers.*

What Do They Mean?

What these figures mean in terms which we can all understand in relation to the price of processed food cans is shown in Figure 2. When the different price structures are converted to a common area basis to allow direct comparison of one metal with another, the decrease in the economic disadvantage of aluminum due to this commodity price is evident. The trend encourages optimistic forecasts of further reductions which would insure a future for aluminum as a can-making material.

Two of the possible methods for making aluminum cans are not based upon light gauge sheet as a starting material, but rather with heavy gauge slugs and rings. However the economic picture in these cases is essentially the same.

The pricing relationship between slugs and sheets will determine which type of aluminum can-making process will be used in preference to another.

It is unlikely that the sideseams of aluminum cans will be soldered. The technical difficulties are so great that other container constructions appear more attractive. Future technology will probably result in cemented sideseam

(*Continued on page 64*)

"Stored heat treatment" here...

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Type H-13

HOT WORK DIE STEEL

Furnished pre-hardened at Rockwell C44-46, Viscount 44 is easy to saw . . . practical to machine! And the savings in heat treat time speed tooling and extrusions on their way up to 48 hours faster.

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DOW | MAGNESIUM

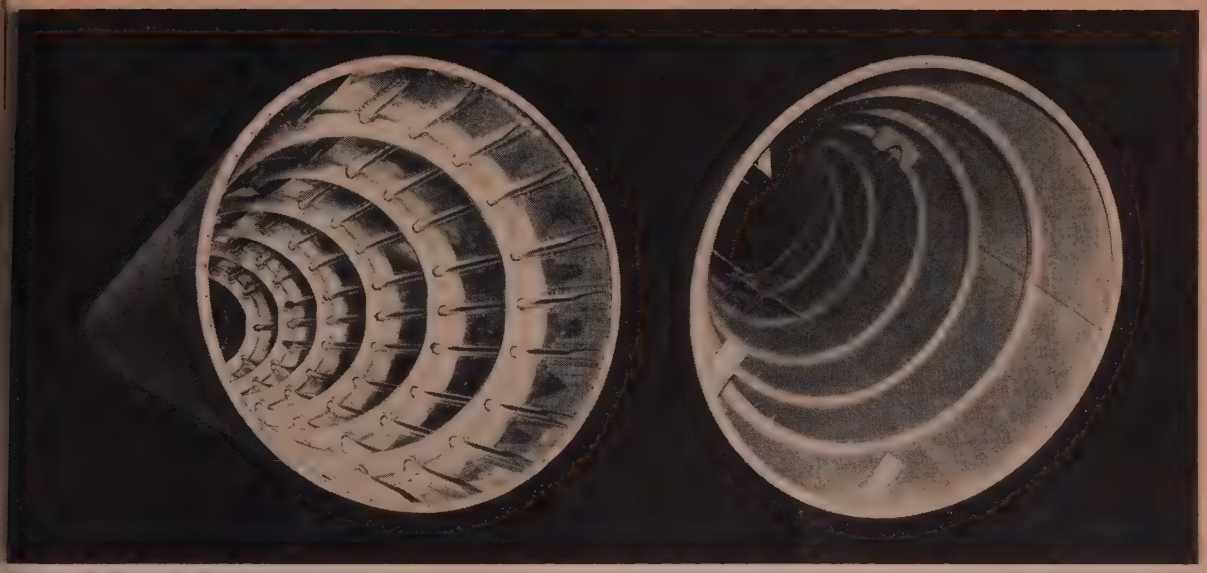
LIGHTWEIGHT DESIGNS

save more than weight

Designers reap a rich harvest of additional benefits as a result of lightness when they use magnesium. Bonuses such as more payload, simplified design, increased performance and reduced human exertion.

People who buy and use the luggage pictured above derive a very direct benefit from magnesium. As this lightweight luggage is made of magnesium, it saves human effort and fatigue. Also, the reduction of weight means more luggage can be carried without extra charge when traveling by air. Magnesium saves human exertion in other products, such as ladders, power tool housings and materials handling equipment.

Another example of the many savings and extra benefits that magnesium —and its resultant load lightening make possible for the designer is in the automotive field. One delivery truck unloads its last parcel and heads for the garage and the gas pump. Another, of identical size, goes on to deliver many



SIMPLIFIED DESIGN in magnesium aircraft part (right) was made possible by its advantageous stiffness-to-weight ratio.

more lbs. of merchandise. Why? The second truck is much lighter—its body is made entirely of magnesium alloy sheet, plate and extrusions. *Because* the second truck is lightweight, it can carry more payload. Or, it can carry the same payload as the first with less fuel, smaller tires and less wear and tear on the engine and transmission. Lighter trucks also save their owners money on license fees, insurance premiums and over-all maintenance.

An even more dramatic example is that of missile design. In one ballistic missile, the elimination of *one pound* of excess weight contributes approximately 18,000 feet of additional altitude and a comparable increase in range! This means vastly improved performance wherever magnesium can be substituted for heavier materials.

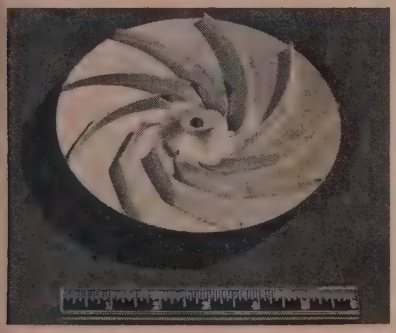
MAGNESIUM LIGHTNESS INCREASES STRENGTH, STIFFNESS

The designer who is seeking a stiff section can achieve it easily—and still save weight—with magnesium alloys. Magnesium weighs only 67% as much as aluminum, 25% as much as steel and zinc. A structure made of magnesium could be 8 times as stiff as the same part in steel if designed to equal weight. If equal stiffness is the design criterion, a magnesium section can weigh 62% less than steel and 25% less than aluminum.

Aircraft manufacturers have learned to exploit these facts to the fullest in conserving precious airborne weight. Critical parts such as wing and tail structures can be designed with more than adequate stiffness for high speed flying conditions. And, in addition to weight savings, magnesium helps provide a smooth aerodynamic surface and reduces "flutter" and "drag". Most important, the use of more rigid magnesium sections simplifies design by eliminating many of the stringers and stiffeners necessary with other materials.

★ ★ ★

WRITE TODAY for new brochure, "Magnesium Design". For your copy of this valuable reference for designers, contact the nearest Dow sales office or write to THE DOW CHEMICAL COMPANY, Midland, Michigan, Magnesium Sales Department 1340CQ-4



22,000 r.p.m. HOUSEHOLD ITEM

This die cast vacuum cleaner fan must rotate at 22,000 r.p.m. and have low starting inertia as well as high centrifugal strength. Only magnesium was able to meet the requirements of this specific design. Casting tolerances are held so closely there is no need for balancing.

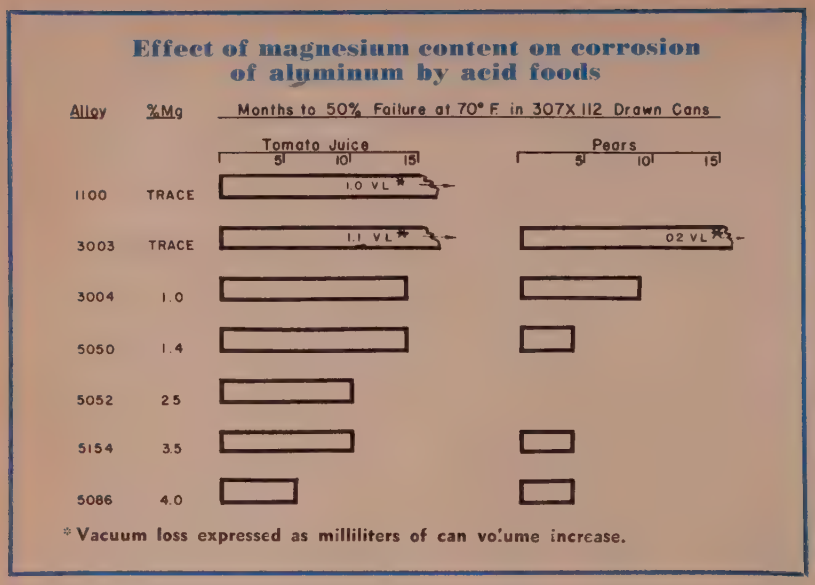
WORKER FATIGUE THWARTED

A prominent automotive manufacturer uses magnesium paint shields in spraying speedometer panels. The weight saving compared to previous shields resulted in less fatigue, higher efficiency for women employees. The excellent alkali resistance of magnesium permits easy removal of dried paint.

PRODUCTION FACILITIES

Excellent production facilities, maintained by Dow and other manufacturers, are located throughout the nation. These firms are well equipped to provide castings, mill products, fabrications and related production services which effectively utilize magnesium's inherent advantages.

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN



■ *Fig. 3. More than price equality enters into the selection of aluminum for volume food packaging. Chart shows effect of magnesium content on corrosion of aluminum by acid foods. Service life of cans for tomato juice and pears drops as magnesium percentage increases. All aluminum cans in this test were enamelled; unenamelled cans made from all alloys failed quickly.*

containers suitable for vacuum holding and pressure sterilization. It is likewise probable that sideseam welding techniques, either electrical or ultrasonic, will in time be practical.

In The Spotlight

For the moment, however, most attention is being focused on four other can making methods, three of which have never been used previously in this country for the production of cans for the large volume processed food items.

These four can-making methods are touched on briefly.

Drawn cans: The only aluminum cans in commercial use in the U. S. for sterilized food products are shallow drawn cans for sardines (made in one draw). Cans with large height/diameter ratios require multiple drawing operations—impractical for high speed production. One advantage of the drawing process over the others is that pre-enameled flat stock may be used as is done with tin plate cans.

Reverse impact extrusion: Satisfactory for small size cans. Height to which the shells may be formed is limited only by the length of stroke available for the punch. Practical limitation is that long stroke presses are slower than desirable for a machine which produces only one can per operation. Ultimately larger diameters will be produced and some pressurized food products may also be packed in these cans.

Forward extrusion: Limitation of height imposed by the length of stroke can be by-passed by impact extruding forward rather than in reverse. Slug used is really a heavy ring from which is produced an aluminum cylinder perhaps long enough to cut into several seamless can bodies to which conventional type ends would be seamed to form three-piece containers.

Drawing and ironing: The process begins by making a simple shallow drawn shell, but the die is bottomless and the punch continues downward to push this cup through a ring slightly smaller in diameter than the cupping die cavity above. This thins the side wall and forces the metal upward, thereby increasing the height of the can. Additional ironing may be done to achieve whatever body wall thickness and height is desired.

Thorough Cleaning Needed

Again limitations are imposed by the length of stroke available. The shell with no sideseam or bottom seam is similar to those made by reverse impact extrusion in that the bottom is heavier than the wall, having the initial gauge of the sheet metal used. Thickness of the side is determined by the difference in diameters of the final ironing ring and the initial cupping die.

Neither extruded nor drawn and ironed containers can be made from pre-enameled lithographed stock. The cans must be heavily oiled during the forming operations and will need to be thoroughly degreased before inside enameling and before lithographing.

A question asked by food packers is whether aluminum cans will be strong enough to withstand all of the handling and mechanical stresses imposed upon containers during packaging and distribution. To provide the same paneling and buckling resistance as tin plate containers, the gauge of aluminum containers must be increased by 35% even when the high strength alloys are used.

The extent to which heavier gauges will be required probably holds the key as to whether aluminum will be used in the near future for the large volume processed vegetable and fruit products. In Figure 2 it was shown that the price of aluminum sheet has been reduced to the point where it approaches tin plate on a gauge for gauge basis. This means that aluminum should find its first use in cans for those products where thermal process is not required and aluminum can replace tin plate of the same gauge. But a further price decrease seems necessary before aluminum will be used extensively for cans which must have great resistance to paneling, buckling and mechanical abuse.

Realizing that heavier gauges of aluminum are needed to match the strength of tin plate cans, the aluminum producers have asked whether packers' operations could not be changed to accommodate less rugged cans. Commercial experience with the aluminum quart motor oil cans has shown that few changes have been required in empty can handling. Presumably the lighter weight compensates for its lower strength and abnormal damage is not encountered. With filled cans, however, the difference in weight in the cans themselves becomes small in comparison to the total weight, and the situation is quite different.

The tin plate container has been engineered to meet the requirements for modern commercial high speed canning operations with the minimum practical gauge of plate. Many economies in plant handling have been achieved by sacrificing perfect container condition. Small but tolerable amounts of denting are now found from a variety of handling operations. It can be assumed that any

Base Prices of Can Making Stock for 30" wide Coils of .010" Gauge

	Cents/ pound	Dollars/ base box
No. 25 Tin Plate	9.1	8.15
5052 Alloy,		
Job Shop Price	56.8	17.43
Commodity Price	32.0	9.82

■ *Fig. 2. Aluminum's approach to near-parity with the price of tin plate grants only limited advantages. Problems outside the realm of economics must still be solved.*

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Wolverine produces aluminum tubing in a wide range of sizes and popular alloys in both drawn and extruded form. You can specify straight lengths or time-and-inventory saving long-length coils.

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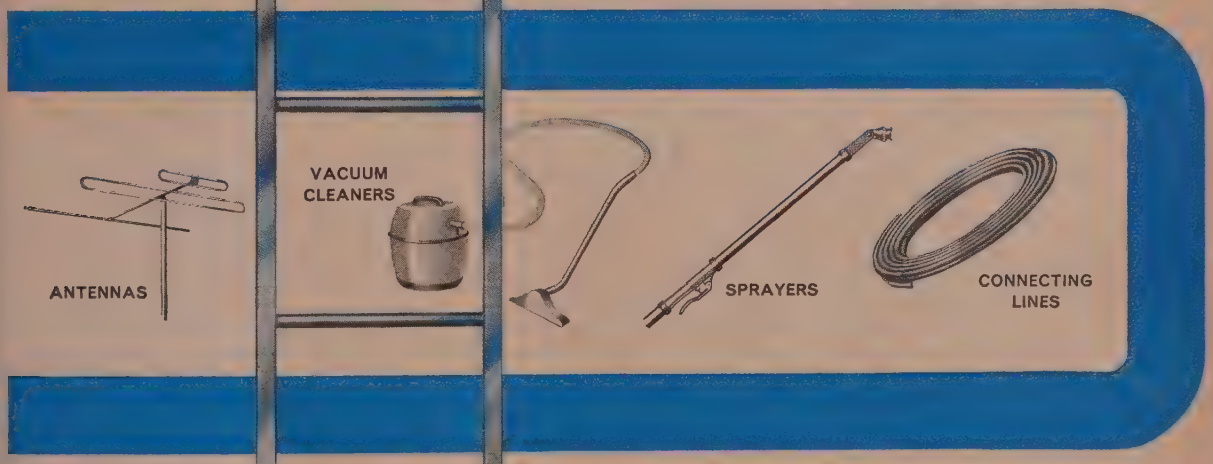

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change to weaker cans would result in even more damage unless rough handling is reduced by lower speeds, equipment modifications, and more manual operations. Definite increases in production costs would thus be expected.

For some foods in smaller can sizes modifications of the canning procedure could be made to permit the use of less rugged cans than are currently employed. For example, pressure cooling might be used to avoid the buckling or straining of the ends. However, if bodies will have less paneling resistance too, there must be a delicate balance between the pressure required to maintain flat ends and that which would cause paneling of bodies as the cans are cooled. For some products superimposed pressure during the entire sterilizing process might be required.

How Much Re-design?

Apart from the operational changes required to accommodate weaker cans, possible changes are foreseeable if two-piece rather than three-piece cans are used, regardless of strength. Equipment which conveys or otherwise handles cans by rolling them on their sides will probably have to be modified to compensate for the absence of a doubleseam on one end. Can runways, spinner cookers and spinner coolers are examples.

Absence of a bottom seam would also require control of the orientation of the cans during labeling and casing. Can unscramblers would have to be modified or other equipment used to deliver all cans to the labeler top end up.

These operational matters and possibly others must be considered in the future if aluminum becomes competitive with tin plate for the processed food packs. And only the actual packing of sizable numbers of cans, plant by plant, will establish the extent of changes which must be made.

Maybe Most Important

Another important question asked by packers about aluminum containers is "How will it hold my product?" It is one thing to discuss the practicability of aluminum cans in terms of their initial cost and to forecast what would need to be changed in a packer's operations in order to accommodate them. These are matters of economics and engineering and the picture has been changing rapidly. It is another thing, however, to consider the question of how well this aluminum package will hold the product during its required storage life. This latter instance revolves around the inherent corrosion resistance of the container and the chemical activity of the product, matters which cannot always be altered by simple engineering nor accomplished at tolerable increase in costs.

In Europe, the economics of using aluminum food cans has been more favorable in the postwar period than here, and a considerable amount of both experimental and commercial experience has been accumulated. Based on this experience, there is little question but that the user of aluminum cans will have to plan on a substantially shorter shelf life for food products generally. In many instances, this lower shelf life will not be important but for some it will be less than is considered the minimum requirement today for tin plate containers in this country.

From reports of European experience one must conclude the following:

1. Almost without exception, processed foods will require inside enameling in order to obtain a shelf life acceptable under any circumstance.

2. When the pH is 5.0 or above, simple enameling will result in a shelf life of two to three years at room temperature storage in most cases before hydrogen springers occur. However, some products in this range will have less storage life expectancy than this.

3. For the more acid products such as fruits, the room temperature shelf life ranges from 12 to 18 months. Even this requires using the maximum protection available from known methods of anodizing, chemical treatment, enameling or combinations thereof.

4. In general there is little difference in color and flavor between canned foods packed in aluminum cans properly protected against interior corrosion and the same foods packed in conventional tin plate containers. For meats and some sulfur bearing vegetables the problem of interior sulfur staining of the container and, in some instances the product, does not exist with aluminum.

What Labs Learned

On the other hand, the tendency for aluminum to bleach some of the highly pigmented products is substantially greater. These findings are essentially corroborated for American product and packing methods by the results of the many experimental packs made by the American Can Co. Laboratories.

This generally inferior corrosion resistance of aluminum as compared to tin plate may seem incongruous in the face of the general belief that aluminum is a metal of superior corrosion resistance. This belief is based for the most part on its resistance to corrosion under atmospheric conditions. Aluminum structures owe their corrosion resistance, not to the stability of the metal itself, but to the skin of aluminum oxide on its surface. This oxide is not only chemically inert, but rapidly repairs itself if damaged as long as there is oxygen available to reform the film.

Inside the modern food can, however, oxygen is present in limited quantities, with no opportunity for replenishment.

The bulk of the data on which the foregoing shelf life observations are based were obtained with 1100 alloy (commercially pure) and 3003 alloy (the one commonly used for cooking utensils). Both of these have been considered the most resistant of the commercial alloys to corrosion by food products, but they are both low in strength. When

Effect of magnesium content on corrosion of aluminum by corned beef hash

Alloy	%Mg	Storage Temp	Months to 50% Failure in 307X112 Drawn Cans — Enameled	Plain
1100	TRACE	70°F	3.0 VL*	
		98°F	3.7 VL*	
3003	TRACE	70° F	2.6 VL*	
		98° F	4.1 VL*	
3004	1.0	70°F	1.0 VL*	
		98°F	1.5 VL*	
5052	2.5	70°F	1.2 VL*	
		98°F	2.0 VL*	

(Enameled: 5, 10, 15 — Plain: 5, 10, 15)

*Vacuum loss expressed as milliliters of can volume increase.

■ *Fig. 4. The picture is better for low acid foods, corned beef hash, for instance. Service life for all alloys is adequate. Inside enamelling is still vital, however.*

Cells without bars

The aluminum furnace cells at the Stalinsk reduction plant in the Kuznetsk basin of Siberia are tended by men in servitude. There are bars around the cells, their jobs, their lives. To subvert and disrupt the economy of the West, Russia is dumping this slave produced metal in the European markets—knowing full well that economic warfare is deadlier than missiles.

European producers, pushed out of their markets, in turn are dumping aluminum into the United States. By then the cycle is completed and the Russian economic warfare is in full swing. It is hard to believe that the unwary purchaser of European metal is indirectly subsidizing Communist economic warfare.

The aluminum electrolytic cells at our Oregon reduction plant are tended by men of all faiths and origins. They work with opportunity, without fear or prejudice. There are no bars around the cells. The metal they produce is used to strengthen the economy of the United States.

Let us be thankful that in America we still have cells without bars . . . cells that bolster our economic existence. Be outspoken enough to perpetuate this heritage.

An integrated producer of aluminum, titanium, and zirconium, from primary metal to mill products.

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GENERAL OFFICES: TORRANCE, CALIFORNIA

High-purity primary aluminum from the electrolytic cells is converted into pig, ingot, and billet forms at Harvey's smelter at The Dalles, Oregon.

Primary pig, ingot, billet

ORDERS NOW ACCEPTED FOR IMMEDIATE DELIVERY

■ *Impact extrusion of aluminum cans at Bradley-Sun Div., American Can Co.*

stronger alloys are being considered as means for lessening the economic disadvantage of aluminum, it is essential that evaluations include the corrosion effects.

Tit for Tat

The canning industry is already familiar with the fact that rephosphorization of steel to increase its strength is accomplished at considerable sacrifice of corrosion performance and cannot be applied in the case of a large number of the more corrosive products. A similar sacrifice in corrosion resistance is made when additional strength of aluminum is sought through the use of the conventional magnesium bearing alloys.

In 1958 some early results from recent test packs to assess the effect of added magnesium were reported. An additional year's storage of these packs in two-piece drawn 307 x 112 containers has about completed the story and a few typical examples will be discussed.

Tests of two acid foods, tomato juice and pears, are charted in Figure 3. After 16 months' storage at 70° F., the effect of increasing the magnesium content of the alloy on reducing service life is well defined. The two plates which contain no added magnesium have lost some vacuum, but have not reached the hydrogen springer failure point, whereas those containers made with magnesium bearing alloys have already failed. All containers for the lots shown were enamel lined. Unenameled cans made from all of the alloys and stored at 70° F. failed in 5 months with tomato juice and 2 months with pears. Both products were badly off flavor.

As typical of the low acid foods, the data for corned beef hash are shown in Figure 4. Here, data from storage at 98° F. is also included to illustrate the low level of corrosion which has taken place. It is probable that an adequate shelf life will be realized even with the high magnesium alloys. However, even such non-corrosive foods must be packed in inside enameled cans, as is evident from the lots of containers which were not enameled or given any special treatment on the inside.

The least corrosive of all the products included in this recent pack appears to be asparagus, but tests revealed clearly that even for this vegetable inside enameling will be necessary.

Final Arbiter Is . . .

As far as the ultimate consumer is concerned the color, flavor, and texture of the product as it comes from the container will be the most important criteria upon which she will base her acceptance or desire for aluminum containers. For the most part she will find no perceivable difference, but in this area there are a few pluses as well as minuses for aluminum.

Our own experiments have given results similar to those reported from Europe as cited earlier. Aluminum containers in which sulfur bearing vegetables or products containing meats have been packed do not show any discoloration under enamel after storage. This is an aesthetic advantage over tin plate containers. Also eliminated is the occasional but somewhat more grievous problem with certain products where black iron sulfide can form in localized areas of the tin plate container and in some instances appear on the product itself.

This problem has been encountered most usually in sea food packs, such as tuna and shrimp. For tuna the use of aluminum containers would appear to be a happy solution, but with shrimp the pinkish cast and color bands are bleached completely to turn the product a muddy gray, and a very strong hydrogen sulfide-like odor is developed.

Aluminum containers tend to bleach the highly pigmented products to a greater extent than tin plate. For the darker fruits this may be a disadvantage unless organic coating systems are developed which are exceptionally effective in blocking all contact with the metal. The problem may be more serious with products such as peaches, pears and pineapple which now require packing in unenameled tin plate bodies to prevent their darkening. Unenameled aluminum cannot be used because of the corrosion hazard, and the use of a fully enameled container results in a dark discolored product.

Asparagus, F'rinstance

As matters now stand, only the broad general problems can be described, and each product will have to be packed and judged in its own specific climate. Asparagus is a good example where an advantage can be traded for a disadvantage. The hazard of iron tanmate discoloration on exposure to air is absent with aluminum cans but the green color is bleached perceptibly.

Except in the case of shrimp mentioned before, flavor and odor differences were not generally found. In the case of severe corrosion during extended storage, however, off-flavors sometimes judged as "astringent" or "bitter" were observed. Presumabily this is due to the increased metallic content.

As we sum up the status of aluminum for food cans, we find that aluminum cans are being used in the United States today for a few products. They will be used increasingly for other products where the metal provides some special advantage, primarily replacing tin plate on a gauge for gauge basis.

But for Processed Food . . .

The use of aluminum cans for the large volume processed products seems farther in the future, since here paneling and buckling as well as denting resistance require the use of heavier gauges of aluminum. To supply and use containers for such products would require major equipment changes by can manufacturers and food packers.

Can manufacturers are anxious to have an alternate for tin plate and are leaving no stone unturned to develop all of the facts about aluminum. However, the key to whether or not aluminum will ultimately be used for vegetables, meats, fruits and other processed items is the future price actions of the aluminum producers.

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MODERN METALS

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LIGHTWEIGHT FANS for PLANES

By John Westell, Pesco Products Div. of Borg Warner Corp., Cleveland

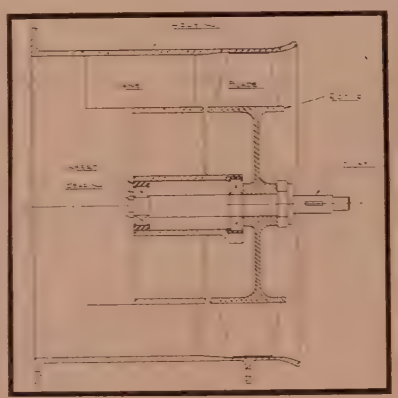
UNTIL about fifteen years ago the centrifugal fan was used to move air for cooling, heating, or air conditioning purposes in aircraft. However, since that time the axial flow-type has steadily replaced the centrifugal due to its greater efficiency, smaller weight, and ease of installation in the ducting.

An axial flow fan is very similar to an axial flow compressor in that it is a rotating machine which imparts a velocity to the air and then converts the velocity to useful pressure. The fan is relatively simple being composed of only three main components: a rotor; a housing containing stator vanes; and a source of energy for driving the rotor. This may be an electric or hydraulic motor, a turbine, or simply a shaft and pulley. Figure 1 shows a group of typical axial flow fans.

The rotor has attached to it the blades which are very similar to airplane wings. However, since there are a relatively large number we consider the whole as a "cascade" rather than one or two isolated wings. The rotor, in turning, produces the velocity and the stator vanes, acting as diffusors, slow the air and at the same time recover useful pressure. For maximum efficiency these surfaces must be smooth, free of any bumps or holes and the trailing edge or back of the airfoil should be as thin as possible. Axial flow compressors which develop very large pressures use machined blades and vanes. However, the cost prohibits the use of such machining for an axial flow fan since the average selling price may only be a few hundred dollars, not in the thousands. Fortunately, the pressures are not excessive and good "as cast" surfaces suffice.

In this regard the CO_2 process has been used to great advantage in producing cores having greater dimensional accuracy as well as a better finish. In the past the core containing the vanes has been a problem particularly for a fan having a large number of vanes since thinner sections sagged before baking.

Prior to four or five years ago magnesium was not used on more than ten percent of the axial flow fans built for aircraft. The feeling was that if the rotating wheel were to hit the inside of the housing a fire would result. This idea has gradually disappeared so that now magnesium fans are used throughout the aircraft industry, even on flying tankers. As aircraft have carried more and more equipment it has become more necessary to keep each component at the minimum weight. For this reason magnesium is now used on practically all airborne fans. Although the rotors may run at 20,000 rpm the stresses are not excessive and are always well below the minimum tensile of 34,000 psi for AZ91C heat treated to T6.



■ *Fig. 2. Design of a Pesco fan requires two stainless steel inserts. Later improvements in foundry practice solved problem of chilling which prevented proper bonding of magnesium to steel.*

Pesco has used this particular alloy almost exclusively because of its good flow characteristics in thin sections. We do not normally require X-ray inspection so that the resistance of this particular alloy to excessive micro-shrinkage is important.

All fans require bearings, and to insure long life and prevent pounding between the bearing and the magnesium a stainless steel insert is used. The insert is incorporated into the coring so that the hot magnesium flows around it. In order to provide maximum bonding the inserts have a rough diamond knurl, preferably with no more than 12 knurls per inch. The inserts are sand blasted to remove grease and scale.

Figure 2 shows a section of a Pesco fan which requires two inserts in the main casting. This presented a problem since the metal inserts acted as chills and tended to prevent proper bonding. Good foundry practice solved this problem.

Although corrosion is always a problem with magnesium, we have not had any indication of this between the inserts and the magnesium. The normal treatment on all castings has been to dichromate in accordance with MIL-M-3171, Type III after machining. We then apply a coat of yellow zinc chromate primer. All steel parts, such as shafts, or hardware are cadmium plated and all screws are dipped in primer before being put into the casting.

Figure 3 shows a typical Pesco fan

Aircraft fan design has changed radically in the past 15 years from centrifugal type to axial flow. Pesco Products finds that magnesium has all the properties for efficient, long-lasting units. Magnesium Association convention paper describes manufacturer's experience.

hich is driven by an electric motor. he motor is housed in the middle of ie fan, using the fan castings as the iotor housing. The motor is first as-embled into a cup-like casting called ie front head and then pressed into ie fan housing. The front head presents problem since the diameter may be .0 inches with ⅛ or 3/16 in. wall. The olerances on the I.D. are always of the rder of .0005 since it is necessary to be ble to remove the stator easily for re-lacement. Therefore, we cannot have ny ovality although there would nor-nally be a great tendency for this to ake place due to the internal stresses. Here we have found it best to take a ough cut before ageing.

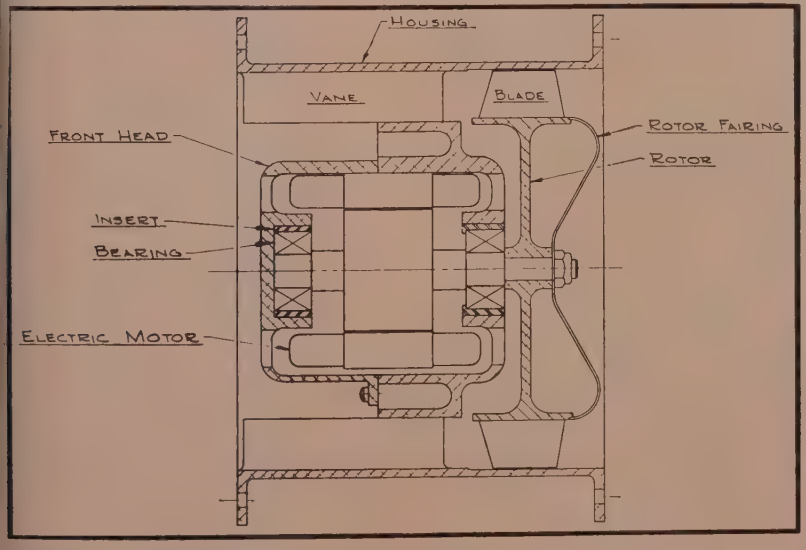
Pesco has been in the fan business approximately two years. Our first castings were relatively heavy, using a minimum of 7/32-in. walls and trailing edges 1/10-in. thick. We had to live with these dimensions as we did not have the time to experiment and, as usual, the first pieces off had to be perfect or we would not meet our scheduled delivery. These first pieces did work, and we met our schedules. Since then we have reduced wall thicknesses to ⅛-in. and trailing edges to 1/16-in.

The difference between 7/32- and ⅛-in. walls may not seem great, but on a 10-in. diameter fan it can amount to 2.6 pounds. The complete unit may weigh 17 pounds so that the weight saving would be 15%.

One of Peco's latest products is the electronic cooling package which consists of an axial flow fan, pump, motor, heat exchanger, and fluid reservoir. In the past this has been a rather bulky package with each component quite separate, surrounded by tubing.

We have made a single unit out of it, building the package around an axial flow fan. The external plumbing has been eliminated, and all tubing is cast in the fan housing. The tubes are stainless steel with 0.020-in. walls. Tubes were used rather than cored passages, as it was felt that the tube improved the strength near thin walls caused by screw holes around flanges.

Temperaures of 400° F. are encountered by these castings due to the hot fluids handled by the pump. For this reason rare earth magnesium, EZ33A, was used even though it does not flow as easily as AZ91. It was also used because of the reduction in porosity which is an important factor when used with high pressure pumps.



■ *Fig. 3. Typical Pesco fan driven by an electric motor. Motor is housed in the middle of the fan, using the fan casting as a motor housing.*

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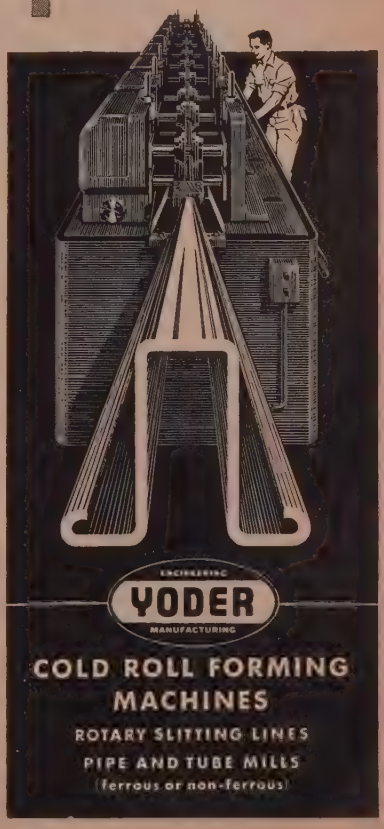


WELDING ALUMINUM with ultrasonic sound waves

New sonic equipment developed to perform "impossible" joining jobs; welds very thin sections, dissimilar metals with slight pressure, often without heat. Automatic unit continuously welds spiral rib to tube.

SIMILAR and dissimilar metals once considered unweldable are quickly joined without fusion, and with very little deformation, through the application of ultrasonic welding.

"In ultrasonic welding, the metals to be joined are clamped at low static pressure between welding tips or sonotrodes, and ultrasonic energy is introduced for a brief interval, usually one to three seconds," J. B. Jones, Aeroprojects engineer, said. "A strong metallurgical bond is produced without the significant external deformation that characterizes pressure welding and without the cast metal zones associated with resistance welding."

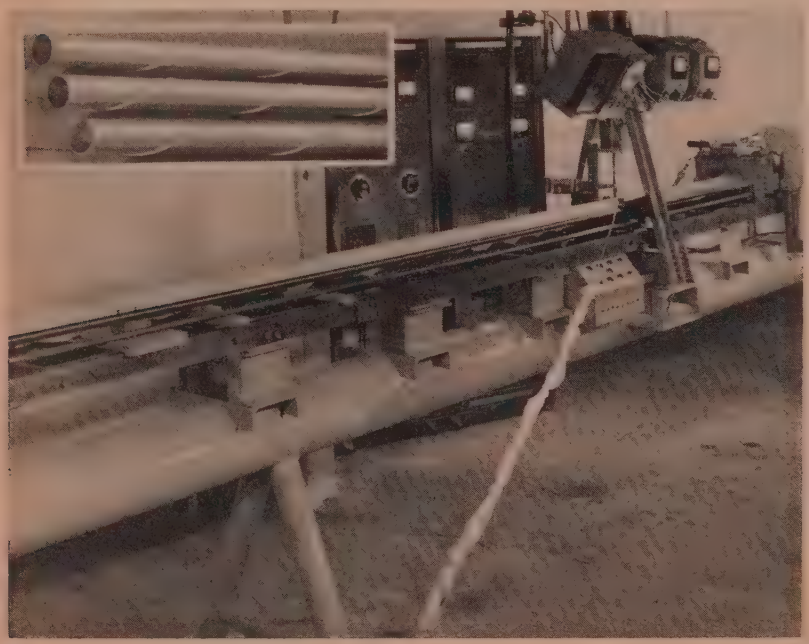
Jones pointed out that the joint is produced "without the aid of solders, fluxes or filler metals and usually without externally-applied heat.

"In most cases, it takes less time than other welding processes, because little or no prior metal cleaning is needed."

Aeroprojects Inc., West Chester, Pa., who originated and developed this new joining method, is marketing a 2000-watt Model W-2000-SR-57-10 Sonoweld production type welder through its subsidiary, Sonobond Corp.

A semi-portable unit, the W-2000-SR-57-10 Sonoweld has a welding frame of box-beam construction, and a hydraulic force system. Its transducer-coupling assembly consists of a nickel transducer, a coupling wedge and a drive-reed which have been especially designed for this unit. The heavy duty generator, designed for continuous duty, is contained in two separate cabinets with ample spacing for components to allow adequate ventilation and insure high duty cycle operation, at the same time eliminating the danger of overheating. The welder is instrumented with an electronic cycle timer, and a Bourdon-tube force gage.

A spot-type welder, Sonoweld can be operated on an ordinary 230 volt circuit, and consumes a maximum of 3.5 KVA of power even when joining 0.050-inch alloy 1100 aluminum sheet. Ultrasonic welding often requires as low as five per cent of the electric power required by ordinary resistance welding. Since no electrical bus-bars or special transformers are required for the installation, this unit is mounted on casters so that it can be easily moved to and operated in various plant locations.



■ *This 35-foot-long ultrasonic seam welder is used to attach spiral aluminum ribs to aluminum tubes. Inset shows thin wall aluminum tube (actually more than 15 feet long) to which aluminum ribs were welded by overlapping spot-type welds. The machine is completely automatic and welds the full-length ribs to tube without the aid of the operator.*

Little Skill Needed

Sonoweld is simple to use and calls for practically no training of the operator; he simply places the work to be welded between two welding members or sonotrodes, and activates a foot switch which initiates the entire weld cycle automatically.

"This is a solid state joining process," Jones explained. "The materials to be joined are subjected to high frequency alternating vibrations, which are generated by the transducer in the welding head system and transmitted through the coupling members to the work being done. The resulting joints are accomplished without fusion, and, in many materials, exceed the strength of similar joints made by standard resistance welding methods.

An outstanding feature of Sonoweld lies in this ability to join dissimilar metals and alloys, and extremely thin gauges of materials which defy conventional welding methods. Materials that have been bonded together, either to themselves or to other metals, include aluminum, copper, nickel, stainless steels, molybdenum, tantalum and niobium. Thicknesses to 0.050-inch of

by 1100-H aluminum and 0.025-inch type 316 stainless steel have been nded together in this size welder.

nts Are Strong

When the results of ultrasonic weld- tests using 1100-H 14 aluminum re compared with military specifica- ns for resistance welds, the tensile- ear strength of the ultrasonic welds eraged 40% greater than minimum re- irements for 0.050-inch thickness and 0% greater for 0.010-inch thickness. elding time was three-quarters of a ond.

In the same kind of comparison on 24-T3 Alcad aluminum alloy, the ten- e-shear strength of ultrasonic welds ade by Sonoweld proved to be two- d-a-half times greater on 0.020-inch ickness and almost twice as great on 0-inch. Welding time was one second.

In addition to basic ultrasonic spot- e welding equipment and its adapta- ns for welding configurations other an the sheet type, equipment has been veloped to produce continuous seam elds.

Ultrasonic continuous welding was complished by Aeroprojects as far ck as 1955 on a classified contract hen aluminum ribs were attached to uminium tubes. This application can

■ *Sonoweld Model W-2000-SR-57-10 used in welding both similar and dissimilar metals is shown welding a cylinder of 2024-T3 Alclad, .040-in. thick.*

now be shown to the public. Illustrated are tubes over 15 feet long to which aluminum spiral ribs were continuously welded by a series of overlapping ultrasonic spot-type welds.

These assemblies were fabricated in a machine over 35 feet long which was completely automated—including indexing of the tube, locating the rib, spacing of the spot welds and complete cycling of the welding operation. Once the operator started the machine, the 15 foot rib-tube assembly was completely welded without further effort by the operator.

Continuous Seam Welder

Shortly after the construction of the overlapping ultrasonic spot-type seam welder Aeroprojects built a successful continuous ultrasonic roller-type seam welder. Using this machine, the work passes under the ultrasonic welding tip which rotates and which supplies ultrasonic power without interruption, making a truly continuous rather than a stitch-type weld. Continuous seam welding equipment is automatically controlled including the complete cycle of starting by a foot pedal, traversing the full length of the weld and automatically shutting off the power and returning to the starting point to receive the next workpiece.

Aeroprojects not only engineered the above seam welders but also made available for commercial use four sizes of spot-type ultrasonic welders all of which operate on a completely automatic cycling basis. Besides the standard spot-type welders Aeroprojects develops special ultrasonic welding equipment to meet the needs of the Defense Department, the Atomic Energy Commission and industry.

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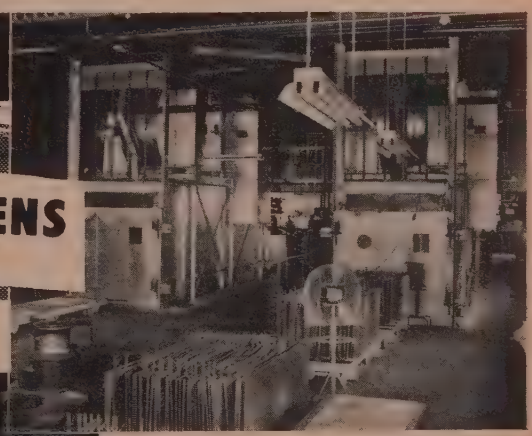

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- Drying
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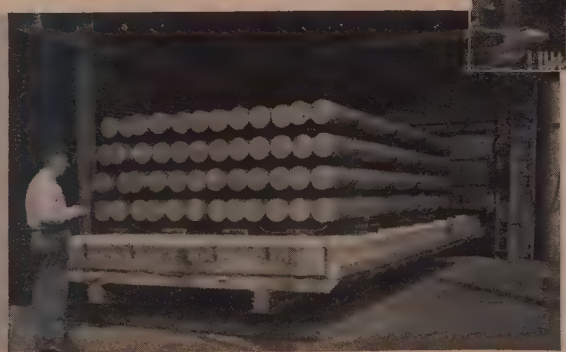
- Baking Finishes



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News Products and People

First Beryllium Closed Die Forging Produced

The first large closed die beryllium part ever forged successfully is shown above on the bed of the 18,000-ton forging press at the Wyman-Gordon U. S. Air Force plant at North Grafton, Mass. Larger presses, including the giant 50,000-tonner at the plant, will be used to make bigger, more complex beryllium parts in the future.

According to Robert W. Stoddard, president of Wyman-Gordon, beryllium may now be considered a structural engineering material for space flight. This technological breakthrough is expected to have far-reaching effects on propulsion systems, missiles applications, and space vehicles, he added.

Beryllium's light weight, combined with other space-flight characteristics, will reduce the ratio between the weight of a vehicle and its power, resulting in added fuel and increased range. The beryllium forging meets a government need for lightweight components which will withstand temperature extremes and measure up to severe demands for nuclear compatibility, corrosion resistance and radiation exposure.

"Beryllium has a number of intrinsically interesting and important properties," Stoddard explained. "It's as light as magnesium alloys. Its modulus of elasticity (stiffness) is one-and-one-half times that of steel. Its behavior in certain types of radiation makes it singularly important in a variety of nuclear devices. Its heat capacity is exceedingly high. It has moderate strength, but an excellent strength-to-weight ratio."

Stoddard pointed out that the metal's brittleness has been a formidable barrier but that the closed die forging technique developed by Wyman-Gordon solves this problem and results in a much more ductile material.

New Die Metal Has High Impact Strength

A new high-strength zinc-base die metal alloy has been developed by American Smelting and Refining Co., 120 Broadway, New York. Properties of the new alloy, tradenamed Formaloy, surpass those of standard die materials for the forming of aluminum sheet for industries such as aircraft.

For years, No. 2 Di-Metal and similar zinc-base forming alloys previously designated as ASTM Grade XXI alloys had been used for this. However, some production procedures now require a superior die metal for more demanding and difficult forming operations.

One of the most significant features of Formaloy, the company reports, is its high impact strength, about double that of slow-cooled conventional zinc-base alloys. The new alloy also has a higher tensile strength, smoother die surface, and uniformly fine structure.

Formaloy is readily workable with no special casting or machining techniques required for fabrication. It is used in drop hammer punches and dies, draw press dies, stretch press dies, blanking dies, hydro-press form blocks, punch press fixtures and many other jigs and fixtures for fabricating sheet parts.

Aluminum Second Popular Metal for Squeeze Tubes

The manufacture of collapsible metal tubes required 8,196,000 pounds of aluminum in 1958, according to the annual report of the Collapsible Tube Manufacturers Council. Total amount of all metal used was 24,416,000 pounds with lead the largest item (13,777,000 pounds), aluminum the second largest, and tin third (1,194,000 pounds). The balance was in tin-coated lead and tin-lead alloys.

Dentifrices continued to be the largest consumer of metal for collapsible tube packaging, using 4,995,000 pounds of aluminum. Some 746,000 pounds of aluminum was used for tubes for household and industry, and 885,000 pounds for medical and pharmaceutical products. Cosmetics used 613,000 pounds of aluminum; and shaving cream, largely packaged in aluminum tubes, consumed 957,000 pounds.

Production of collapsible tubes in all metals during 1958 totalled over 1,000,000,000 units for the fourth time in the industry's history, the council reported.

Alcoa Markets Its New Spangle Sheet

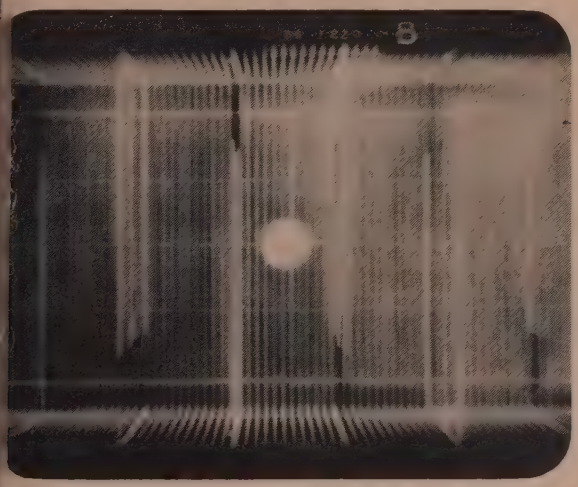
Aluminum Company of America is now selling its new decorative product. Called Spangle Sheet, the unusual, glittering finish of the product has vast possibilities in such fields as automotive trim, refrigerator and appliance trim, lighting fixtures, jewelry and novelty items, gift ware and interior decorations.

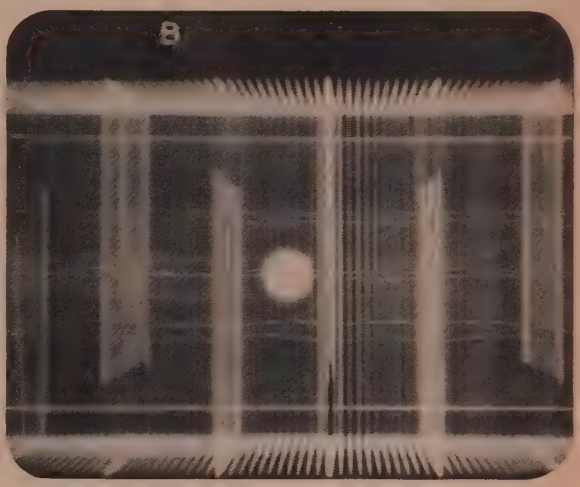
The manufacturing process was first announced in 1956. Large grains are induced in aluminum alloy sheet. Subsequent acid etching causes individual grains to stand out in relief. Action of the etch develops mirrorlike facets on each grain.

Different positions of the grains cause various degrees of light reflection from the surface of Spangle Sheet. The light

An oil cooler as it comes from the airplane engine. Radiograph below shows accumulations of sludge and dirt on the tubes.

After cleaning, the oil cooler is ready to return to its job. Radiograph below shows dirt gone and passages unrestricted.





To keep an engine's bloodstream clean

Oil coolers are vital to today's aircraft engines. At overhaul time they must go back on the engine clean as new. No minute particles of carbon or metal can remain to be a threat to the renewed engine. Cleaning them has become a specialty with SMS Instrument and Accessories Corp. of Idlewild Airport, N. Y. C.

To show that each cooler they clean is free of debris, it is sent to Industrial X-ray Incorporated, New Hyde Park, New York, to be radiographed. And when the cooler goes back to its job, its x-ray certificate of cleanliness goes with it.

In such inspections of assemblies, in quality control, in nondestructive testing, radiography provides a means of "seeing" internal conditions and also a lasting record of what is seen.

Producers of castings, and makers of welded products, find radiography a means of expanding their business and making sure only high-quality work is delivered.

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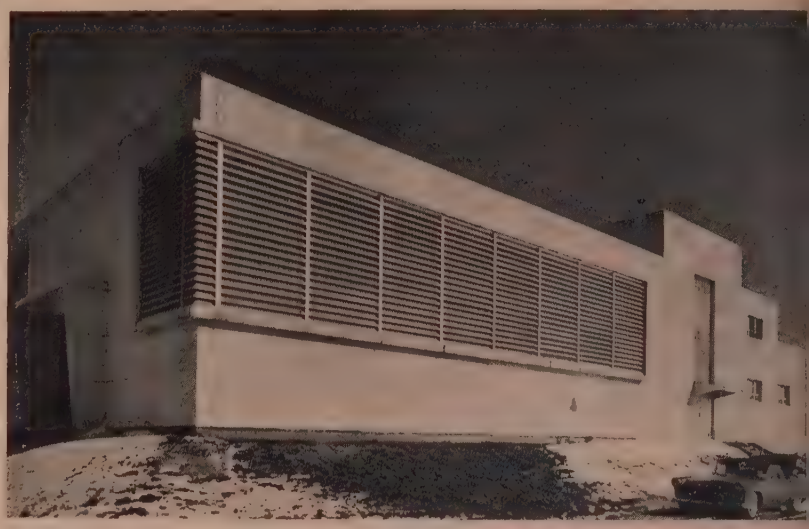
pattern continually changes, offering many variations in the finish.

The product can be formed into a wide variety of shapes. Alcoa offers flat Spangle Sheet in mill finish, spangle etch finish, and spangle etch finish plus Alcoa decorative colors. Mill finish is designed for fabricators who are equipped to apply the spangle etch in their own shops.

Thicknesses range from .032 in. to .100 in. Maximum width is 36 in. and maximum length is 96 in. Larger sizes and gauges are being developed.



Severe Test for Protective Coating Process

Aluminum louvers of the ventilation buildings at Hampton Roads Bridge-Tunnel, Chesapeake Bay, show no signs of deterioration or even loss of original luster after an eighteen months exposure period. There was no evidence of oxidation residues or discoloration after exposure to saltwater atmosphere, corrosive salt spray, fly ash and soot, exhaust fumes from gasoline engines, and sunlight, fog and rain.

Preservation of the finish is due to a combination of anodizing and a clear protective coating which was applied to the louvers by their manufacturer, Construction Specialties, Inc., Cranford, N.J. After fabrication the louvers were anodized with a light grey finish, and then sprayed with a protective butyrate lacquer furnished by the Egyptian Lacquer Co., Kearney, N.J. The butyrate film-former, supplied by Eastman Chemical Products, Inc., subsidiary of Eastman Kodak, gives the coating its extremely tough, durable, and non-yellowing characteristics.

Reynolds Designing First Aluminum Deep-Sea Submarine

An aluminum submarine which will plumb ocean depths three miles below the surface for deep-sea exploration is being designed by Reynolds Metals Co.

J. Louis Reynolds, executive vice president of Reynolds Metals Co., said the first phase in a five-stage project has been completed and work is proceeding on the second phase.

The five phases in the project to construct the Reynolds submarine, named the Aluminaut, are: 1. Feasibility studies to determine practicability of construction with high strength aluminum alloys, and to establish general dimensions and specifications. 2. Preliminary design and structural model tests. 3. Final design with complete specifications. 4. Fabrication of the submarine and proof testing of structural components. 5. Proof testing with unmanned dives, and final readiness for manned deep dives to 15,000 ft.

The Aluminaut will be about 48 ft. long, with a 30-ft. cylindrical pressure hull made of 6-inch aluminum plate. Its 7-ft. inside diameter will accommodate a pilot and two observers plus over 3400 pounds of instruments.

Operating as a true submarine without cables or hoists it will range nearly 100 miles along the ocean floor during a 36-hour deep-water voyage.

The Reynolds-sponsored project is being carried out by the Southwest Research Institute in San Antonio, Texas. Commenting on the project, Reynolds said, "We are convinced that the Aluminaut will demonstrate the valuable potentiality of aluminum for various types of submarines. It will prove the feasibility of large, speedy submarines for transporting cargo and personnel in comfort, economy and safety below inclement weather and possible hostile attack."

dditive Makes Synthetic inishes Easier to Strip

The ability of alkaline paint stripng solutions to remove synthetic finnes has been greatly improved by a ew additive developed by Oakite Prodcts, Inc., 50A Rector St., New York, anufacturer of chemical specialties for idustry.

Known as Oakite Stripper Additive No. , the new product is a solvent. It conerts a narrow-range stripping solution nto a wide-range solution capable of emoving epoxy, acrylic, and similar ough finishes, according to Oakite. Use f this additive makes it possible to alvage rejects economically, and to reiove paint build-up from hooks, spray ooth filters, and other equipment used n the painting operation.

The new material is added to alkaline olutions in the range of 10 to 20% by olume. The resulting solutions are said p cost only one-quarter to one-third as nuch as solvent strippers of equal effeciveness.

Electric Hoist Has Aluminum Housing

A coil chain electric hoist with frame of diecast aluminum alloy is made by the Duff-Norton Co., Pittsburgh 30, Pa. Models range from one-quarter ton to two-ton capacities and feature mechanically interlocked push button controls operating on 115 volts regardless of motor voltage.

A trolley-mounted hoist may be pulled along by the control cord, since it incorporates a strain cable. Other operating features include an easily adjusted limit switch, an instantaneously releasing brake and sealed-in lifetime lubrication.

The aluminum housing is designed in sections to permit ready access to all parts, making it easy to exchange voltages, rechain the hoist or adjust the limit switch.

Changing from hook to lug, or shifting from single to double chain lifting can be accomplished by removing three screws and replacing or moving the suspension unit.

Changing the Coffing Quick-Lift Hoist from one voltage to another is facilitated by having all connections at one end of the hoist. Terminal boards and wires are identified and only seven quick-connect terminals must be changed.

Aircraft Industry Tests New Titanium Alloy

An ultra-high temperature titanium alloy, MST 881, announced last year by Mallory-Sharon Metals Corp., Niles, Ohio, is moving from the realm of a laboratory material to a practical, useful metal, with tests by leading airframe, engine and missile producers.

Graham B. Brown, vice president of Mallory-Sharon, said that production forgings from the new materials have been made to meet aircraft industry specifications.

MST 881 titanium alloy has excellent

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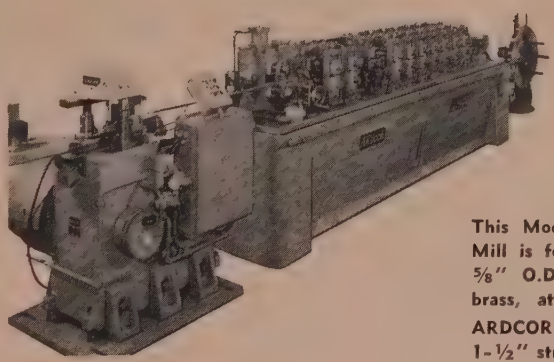
NEW LOCK SEAM TUBE MILL

Maximum Capacity Up To 1" O.D.



This Model SF Lock Seam Tube Mill is forming TV table legs of 5/8" O.D., .016" wall simulated brass, at 120 f.p.m. Cutoff is ARDCOR Model 10 Press with 1-1/2" stroke, 60 strokes per min.

The new small Model SF ARDCOR Machine features: High production speeds; roll space 5.5"; spindles 1.5"; new style rugged base with tool compartment and slanted front recessed for better operator stance; special narrow side roll stands with close 10" horizontal centers; fixed spur gears; quiet running all V-belt drive; compact 3-roll straightener; low voltage protection. Basic machine readily converted to a Cold Roll Forming Machine.

ARDCOR Roll Forming Machines and Lock Seam Tube Mills are available in seven standard sizes, other sizes to customer specifications.

If your products can be cold roll formed, ARDCOR engineers can supply advancements in design and machine construction to produce them better . . . at greater speeds and profit.

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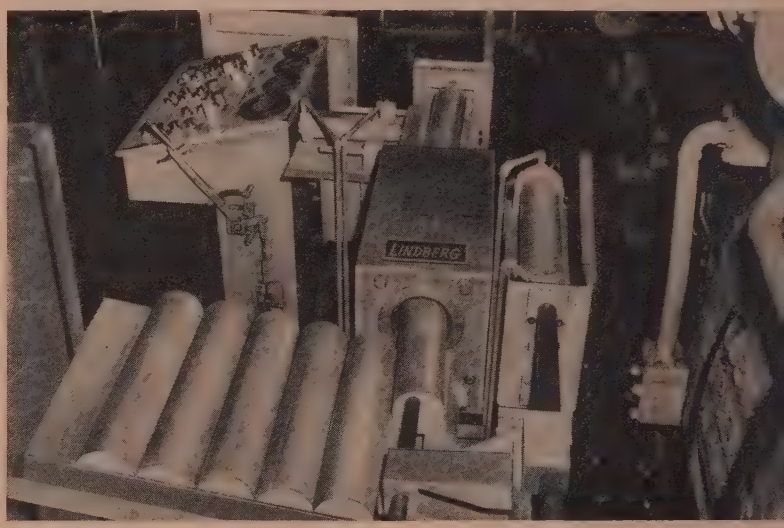
long term strength characteristics at temperatures of 1100° F., and short term strength characteristics at temperatures as high as 1600°F.

It is now being tested, Brown said, for use in compressor shafts, wheels and blades in Mach 3 jet engines where prolonged high temperatures will be encountered. MST 881 is also under evaluation for use in landing apparatus of manned skip-glide vehicles, i proved prototypes of the X-15 vehi soon to be flown.

Studies are also being carried out the use of this alloy, called the m significant advance to date in the fi of titanium metallurgy, in high temp ature gears, machine gun poppet valv and steam turbines operating at 1000° Mallory-Sharon reported.



Extrusion Billet Heater Gives Exclusive Heat Control

A new induction billet heater which provides an improved control system for accurately heating aluminum billets to precise temperature for extrusion has been introduced by the High Frequency Heating Division, Lindberg Engineering Co., 2444 W. Hubbard St., Chicago 12.

The exclusive "Metered BTU's" system measures watt-hour input to the billet with an integrating watt-hour meter and also determines, with a totalizing timer, the amount of energy absorbed by the billet. A means of compensating for the starting temperature of the billet is provided. Thus, with a billet of known weight and known i tial temperature, a predetermin amount of energy can be selected heat the billet to the desired extrusi temperature.

"No prod type themocouple, with inherent inaccuracy and maintenan is required," the company said.

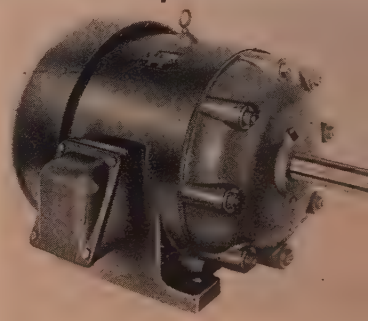
With low voltage power source smooth stepless power control can obtained by the use of saturable co reactors. This eliminates high contra tor maintenance cost as well as provi ing control of the billet heating rate.

Fin-less Aluminum Case Makes Motor Explosion Proof

A complete line of motors housed in aluminum alloy is made by Electra Motors, Inc., 1110 N. Lemon St., Anaheim, Calif.

The motors have no external cooling fins and have been accepted as explosion-proof by Underwriters Laboratories, Inc. for Class 1, Group D (gasoline vapor) and Class 2, Groups F and G (explosive dusts) service in the new NEMA rerated frames 254U-256U, 284U-286U and 324U-326U.

Superior heat transfer characteristics of the alloy make possible a clean, uncluttered frame, which makes the motor particularly valuable for use in dusty or dirty atmospheres of an explosive nature, where accumulation around fins would be dangerous.



The new motors, because of the al minum alloy housing, also provi lighter weight, increased tensile streng and greater corrosion resistance th conventional materials and design.

New Thin-Walled Pipe Has Standard Wall At Ends

Increased use of aluminum pipe in petroleum, farming, mining, chemical and other industries is expected as a result of Aluminum Co. of America's recently developed Unistrength Pipe.

Alcoa has produced seamless, one-piece pipe combining thin walls with a standard wall thickness at pipe ends. The resulting weight reduction, about 40%, has substantially lowered costs, narrowing the price gap between aluminum and steel. At the same time, the variable wall principle strengthens joints, usually the weakest link in a piping system, by concentrating metal at pipe ends.

The ratio of thick to thin walls is selected to provide uniform bursting, tension and bending strength along the pipe's length after welding. Although Alcoa Unistrength Pipe is adaptable to all joining methods, it is particularly advantageous for welded joints.

Alcoa Unistrength Pipe, in 40-ft. lengths, currently is being made in alloys 6063-T6 and 6061-T6 with schedule 40 wall thickness at the ends. This permits the use of standard aluminum fittings and flanges. Adidtional combinations of wall thicknesses can be produced for other joining methods.

Embossed Tubing for "Do-It-Yourself" Line

Latest addition to Reynolds Metals Co.'s "Do-It-Yourself Aluminum" line is embossed aluminum tubing in three patterns, an oval-in-rectangle figure, a fine hexagon pattern and a ribbed, or fluted design.

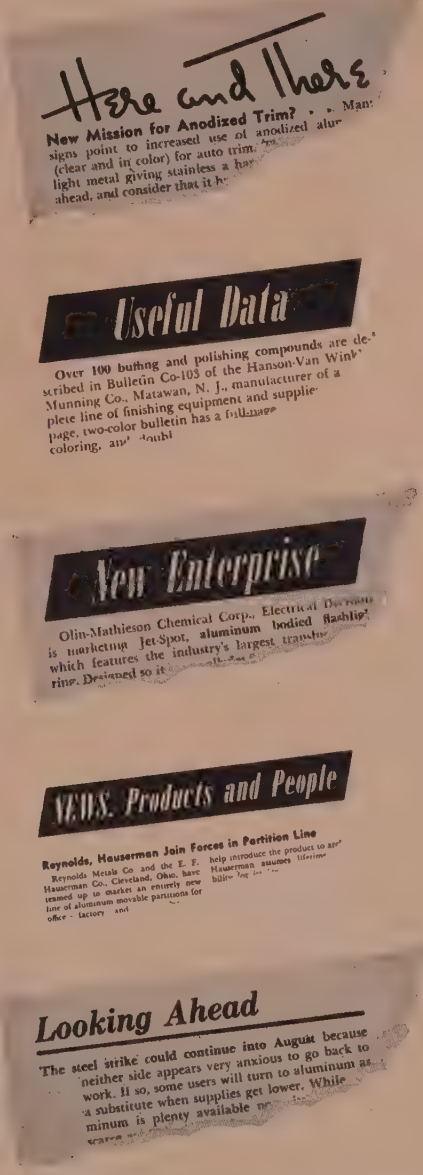
Lloyd Sanders, manager of Do-It-Yourself Aluminum markets, said that the new product fulfills hobbyists' requests for a decorative version of the plain tubing they use as table legs, braces and supports. It can be used with present one-inch fittings and can be formed and cut with ordinary household tools. It comes in six-ft. lengths.

The new tubing is offered at the same price as plain tubing. The "Do-It-Yourself Aluminum" line is now on sale in 15,000 U.S. hardware stores and other retail outlets.

Does anybody read the book?

THE ANSWER to this question is of vital concern to every industrial advertiser, for it determines whether his message is getting through to the reader; whether he is getting maximum mileage out of his advertising dollar. Without an attentive audience, the advertiser's message goes unseen, unheeded.

The editorial departments of **MODERN METALS,** as well as the feature articles in this issue, are well calculated to capture and keep the reader's attention.



HERE & THERE: Notes and comments on significant developments on the light metals scene. Often in a light vein, but factual, provocative.

USEFUL DATA: New brochures, booklets, etc. on new equipment, processes, materials, services of direct interest to light metals users.

NEW ENTERPRISE: Succinct news briefs covering new and significant product and process developments concerning light metals.

NEWS, PRODUCTS, PEOPLE: No puffs; strictly news of value and interest to readers. New products, equipment, materials, services, industry trends.

LOOKING AHEAD: Analysis of current developments, what they mean to light metals users. Keeps readers a step ahead of trends.

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THE WILLIAM L BONNELL COMPANY, INC.
NEWNAN, GEORGIA

February 11, 1959

Mr. Erwin Loewy
Loewy-Hydropress Division
Baldwin-Lima-Hamilton Corp.
111 Fifth Avenue
New York 3, N. Y.

Dear Mr. Loewy:

As time rushes by I often fail to express my feelings of appreciation to persons who have helped to establish, maintain and improve our business.

The three 1250-ton Loewy-Hydropress extrusion presses you installed for us are running twenty-four hours per day, often seven days per week. They are producing tonnage far in excess of our expectations. Many of our shapes are very intricate and require extreme precision tolerances. Upkeep and maintenance, even in the face of almost constant use, is remarkably low.

Our best way to thank you and your organization is to say, "Rush the 2200-ton press now on order".

Most cordially yours,

The William L Bonnell Company, Inc.

William L Bonnell
President

WLB:pt

MORE THAN 30 years ago, William L. Bonnell originated and marketed the first decorative mouldings for the building trades extruded from aluminum —and a new industry was born. Today the company which bears his name and which he heads is the largest manufacturer of decorative aluminum mouldings in the world and the largest independent aluminum extruder in the U. S. Serving a discriminating clientele in the building trades, the glass industry, and the architectural profession, the Bonnell organization provides for its customers the industry's most skilled craftsmanship and its most intensive research facilities, constantly at work setting the pace for progress.

Like many other loyal Loewy-Hydropress customers, when seeking high competence in machine design, the Bonnell company has good reasons for turning again and again to Loewy, the dean of American extrusion press design.

Whether a 20,000-ton mammoth or a 500-ton laboratory model, the same superb engineering skills go into every Loewy extrusion press.

Each Loewy press is an individual product of the machine builder's art, and designed to the specific requirements of the user. Inherent in the design is every feature vital to profitable operation: short dead-cycle time, accessibility for speedy loading and quick tool change, independent pressure source for all auxiliary movements, high production speed, positive container sealing, and close alignment. And Loewy offers not only the finest extrusion presses, but also expert counsel on production planning.

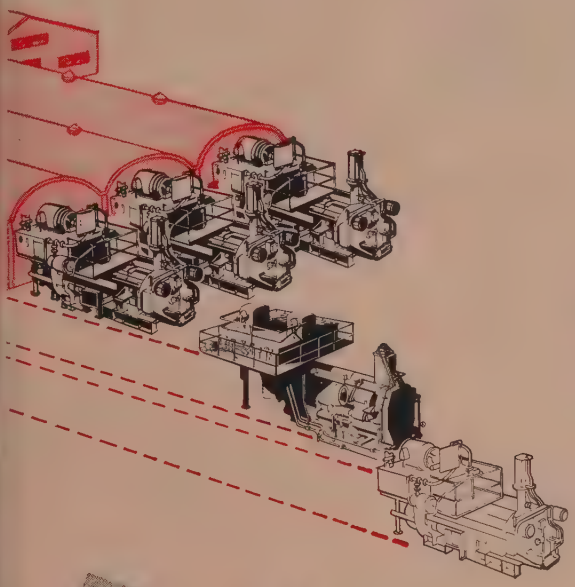
Before you initiate or expand extrusion facilities, get the advice of Loewy-Hydropress. Write us at Dept. D-4.

OR LOEWY:

ganization is to say,

ush the 2200-ton press now on order.'"

—The William L. Bonnell Company Inc.

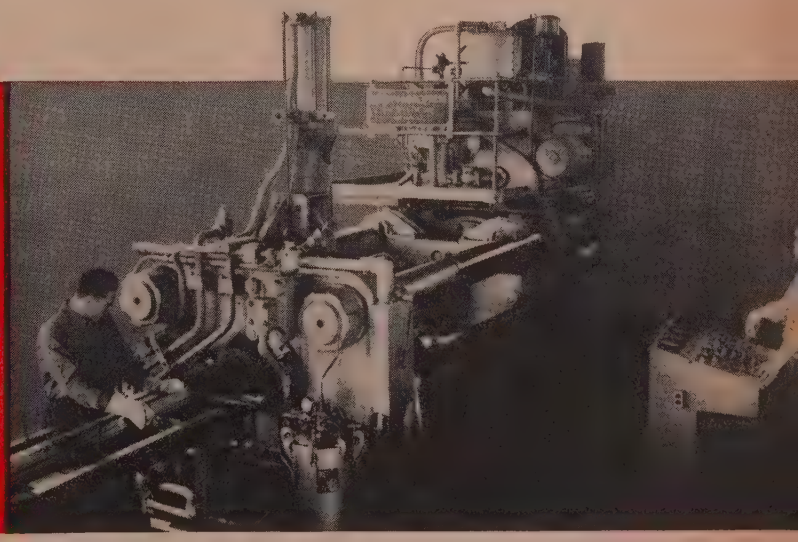


THREE LOEWY PRESSES IN OPERATION

A FOURTH ON ITS WAY

A FIFTH ON ORDER

One more example of the frequent repeat orders which speak for our customers' lasting satisfaction.



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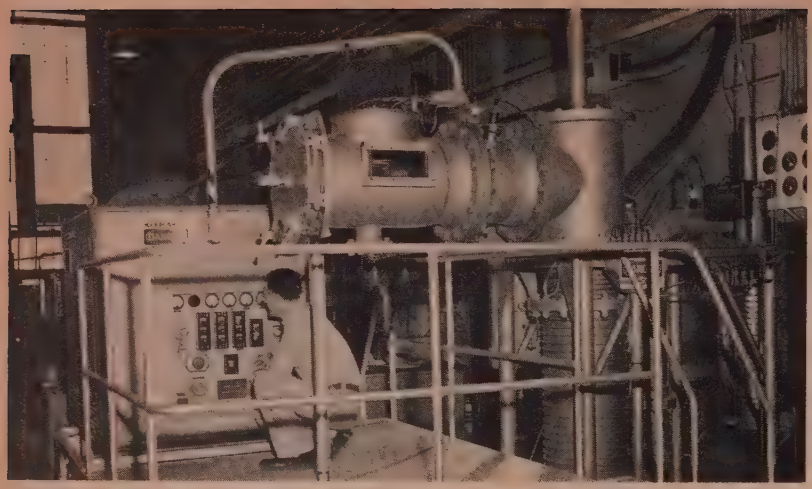

Unique Welder Joins High Temperature Metals

A new electron beam welder joins reactive and high-melting-point metals such as beryllium, molybdenum, tantalum, zirconium, hafnium and other exotic metals for critical missile and atomic reactor applications.

The welder was designed and constructed at the research laboratories of Air Reduction Co. in Murray Hill, N. J. It applies a high intensity electron beam to weld metals which could not be welded satisfactorily or were very difficult to weld.

The electron beam bombards the materials to be welded in a vacuum chamber, and the process requires custom-built equipment for specific jobs. High vacuum prevents contamination by the atmosphere during the welding process, one necessary condition for the effective welding of reactive metals. Many of the contaminants that might be present in the original work pieces are removed during the welding process, according to Air Reduction Co.

The size of the electron beam, as small as 1/16-in. diameter, can be controlled to a much greater degree with the new method. Welds are stronger, more ductile, with improved contour.

New Owner for Coast Distributor

Perry Kilsby Inc., a leading West Coast Metals distributor, has been purchased by The Republic Supply Co. of California, Los Angeles.

According to John J. Pike, president of Republic Supply, the acquisition is part of his firm's long-range diversification and expansion program, and involved the purchase of all inventories and assets. Perry Kilsby Inc. distributes all types of metal tubing, including aluminum, steel, carbon, alloy, stainless, and PVC.

There are to be no staff changes at Perry Kilsby Inc. Firm name will remain the same and Perry Kilsby, founder, will remain as general manager at present headquarters, 2501 Malt Av., Los Angeles.

Expanding-type Abrasive Cone Has Aluminum Core

An expanding-type abrasive cone, called the "Flexcone," made by Nu-Matic Grinders, Inc., 8224 Carnegie Ave., Cleveland 3, Ohio, is said to eliminate much of the abrasive waste usually associated with cone-type finishing wheels.

Abrasive sleeves are retained on the wheel under almost all grinding conditions and speeds ranging from 2000 s.f.p.m. and up, according to the manufacturer. Field tests show that because of this feature an average of one third more useful life can be expected from each abrasive sleeve.

Nu-Matic's new Flexcone is constructed of a machined aluminum core with individual rubber flexers at the periphery. The flexers lie flat when the cone is at rest permitting easy placement or removal of the abrasive sleeve. When the cone is in motion the flexers expand and grip the abrasive so that it cannot slip or "walk" in any direction regardless of the way the cone is moved across the work piece.

Maintenance costs of the cone are very low, according to Nu-Matic, because the flexers are replaceable. The Flexcone can be used with snug-fitting sleeves as a hard mandrel for heavy

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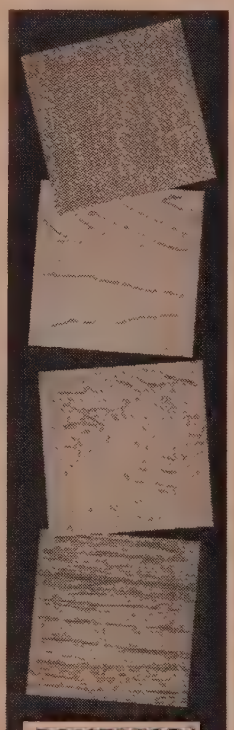

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★ Combines all the infinite varieties of texture, color and design of plastics with the strength and formability of aluminum or steel.

★ Will not chip, crack, craze, peel or delaminate.

★ Resists abrasion, chemicals, weathering, aging, moisture; will not support combustion.

★ May be formed, drilled, punched, sheared, fabricated as easily as the metal alone; for complicated drawing or forming operations may be worked at elevated temperatures.

★ Available in fire-resistant honeycomb sandwich panels for doors, walls, pre-fabricated homes, bulkheads, balustrades, etc.

★ Specifications and samples are available upon request. Naturally YOUR unique production problems will be given expert consideration. Panelfab's specialized engineering service can provide complete technical assistance in the proper selection of film types, thicknesses, and base materials to achieve the desired results in your finished products.

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ock removal or, with slightly over-size eeves, as a soft mandrel for polishing. Nu-Matic Grinders makes Flexcones two models, No. 100, 1¾ x 1 x 3 iches long; No. 200, 3 x 2 x 3¾ inches, ith 5/8—11 arbor hole, or adapter to educe to 3/8—24 shaft. They come with iedium or fine grit abrasives.

New "Hoop" Toy Ready for Market

Mirro Aluminum Co., Manitowoc, Vis., thinks it has a new toy product hat will match the Hula Hoop for sheer play pleasure" for youngsters and rown-ups.

The unique Mirro Hoop Ball is a imple toy consisting of two green enam- led aluminum hoops with a red plastic all for each. Operation, however, re- quires skill and coordination, Mirro aid. The experienced performer can eep the plastic balls gyrating in both oops by a coordinated circular motion f the hands.

The beginner soon learns a number f variations in operation . . . passing he gyrating ball and hoop through the egs, switching hoops from hand to hand nd from person to person, or tossing oop into air while at the same time eeping the ball in orbit.

Packaging Industry Reports Record Foil Use

Record consumption in 1958 of close to 37 million pounds of aluminum for rigid foil containers was reported by the Aluminum Foil Container Manufacturers Association, Pittsburgh, Pa.

"This compares with approximately 33 million pounds in '57 and 30 million in '56, a rate of increase of better than 10% annually," said Stuart J. Swensson, AFCM secretary. Figures for '54 and '55 were 19 million pounds and 22 million pounds respectively.

The expansion of aluminum foil container applications gained added momentum during the past year, Swensson added, with the introduction of new high-speed machines for handling and closing containers.

The frozen food and baking industries represent the largest markets for foil containers, together accounting for 95% of aluminum container production.

Lubricants Increase Die Casting Shot-Sleeve Life

A series of Cold Chamber die-cast plunger lubricants is expected by the manufacturer, American Charcoal Co., 201 S. Green St., Detroit 17, Mich., to reduce shot-sleeve replacement problems substantially.

The products in the Dylube No. 400 series of cold chamber plunger lubricants feature a melt, flash boil and end point in excess of molten metal temperatures as it enters the shot well. They are designed to resist the sustained high temperatures found throughout the cold chamber area.

American Charcoal points out that shot-sleeve problems have been largely due to inability of plunger lubricants to maintain alkalinity. The lubricant tends to "flip" to the acid side; and the nitrided skin of the sleeve walls and near the shot hole and plunger tip become etched and pitted, exposing the softer metal underneath.

Progressive erosion of the shot-sleeve, accelerated by the molten metal, makes it necessary to re-bore and re-nitride or replace the shot-sleeve. The Dylube No. 400 series contains sufficient alkaline reserve to insure against "flipping" increasing shot-sleeve and plunger life up to 75%.

The plunger lubricants eliminate such common cold chamber die-casting problems as flash-back of metal over the plunger tip and into the cold chamber; oil spatter on the castings; and dripping of plunger lubricant from the plunger tip onto the equipment bed. They are recommended for use on new aluminum as an interim die break-in. They come in pigmented and non-pigmented formulations.

You'll get increased production plus greater versatility with a

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CONTACT WHEEL GRINDING

FLEXIBLE BELT GRINDING

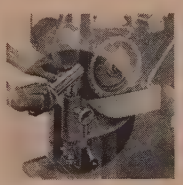
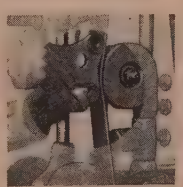

ROD GRINDING HOLDER

TABLE & PLATEN GRINDING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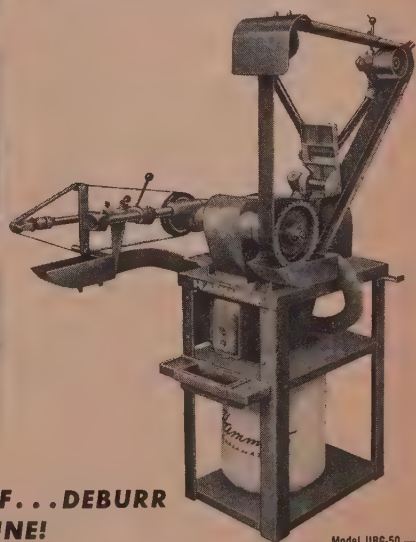
This modern Hammond Universal Belt Grinder provides more ways of using abrasive belts on one machine than ever before. It can be used for a wide variety of grinding, polishing, buffing and deburring operations. This time-saving machine will speed up production and decrease labor costs on many operations in your tool room, machine shop, fabricating, assembly and other departments. Can be furnished as a bench or floor model, with or without built-in DusKolector. Many combinations available. Write for catalog.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MODERN METALS
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Test Aluminum Extrusions As Box Car Liners

Tests are in progress which demonstrate still another means of cost and weight saving by railroads.

Baltimore & Ohio car No. 468029 contains the first installation of Reynolds inner liners, interlocking boxcar linings designed to protect car walls during loading and unloading.

The wall system consists of extruded aluminum panels that can blanket wall areas to any height desired, by the addition of sections.

An extruded aluminum clip fastens the aluminum to the car wall with blind rivets, replacing the unwieldy welded-in method used with conventional steel liners. The new wall system eliminates the need for periodic painting.

Developed by W. J. Crabbs, of Reynolds' Product Development Dept., the inner liners are fabricated from 6063-T6 alloy. Bottom panels, which receive the most wear, are ¼-in. thick; top sections are ⅛-inch. The liner components are extruded by Reynolds at its Grand Rapids, Mich. plant and will be shipped direct to railroad shops.

Reynolds engineers state that the panels' light weight—less than half that of steel—should effect visible savings in day-to-day railroad operations. Installations become a permanent part of the car, but can be removed and re-used.

New Technique Forms Titanium Rocket Head

Hot-rolled-spun hemispherical rocket motor heads have been formed by Titanium Fabricators Inc., Burbank, Calif., on the Tifab hydraulic spinner.

The parts are formed in one piece without welding, from a variety of high-strength metals including titanium and zirconium alloys. Head and case are continuous and bosses can also be formed integrally with the heads. The result is greater strength and material savings of as much as 500%, according to the company.

The new fabrication technique devised by Tifab uses equipment originally developed for fabrication of lighter weight pressure vessels for missiles.

"The hot spinning method replaces normal deep drawing, forging and cold shear spinning processes, thereby substantially reducing tooling costs," said Fred Spiegl, president of Titanium Fabricators.

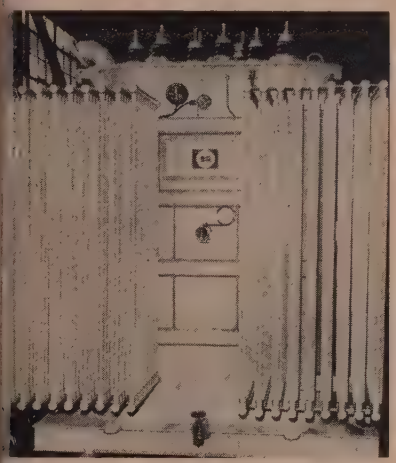
"Tifab's hydraulic spinner deforms the metal by controlling heat and rate of forming and the amount of force used. This allows selection of the area least resistant to forming while retaining the most desirable properties of metals when in the finished shape."

Diameters up to three feet are now available, but larger diameters up to 120 inches can be economically made, according to the company.

Vinyl-Coated Siding Has Ten-Year Guarantee

House siding made of vinyl coated luminum is a product of Hastings Aluminum Products, Inc., Hastings, Mich. efore fabrication, both sides of the luminum are coated with a special ormulation made with Geon vinyl esin supplied by B. F. Goodrich Co. he enamel-like Geon coating—called uperclad—is by Sherwin-Williams Inc. The siding retains its durable finish or years, needing only an occasional ashdown for maintenance. Geon finish guaranteed against blistering, cracking, or crazing for ten years.

The siding panels come in ten ft. engths with eight inch exposure, in hite or pastel colors. Panels lock together to form a weather-tight V-groove xposing no nail heads.



Power Transformer Has Great Thermal Capacity

What is said to be the country's first ll-aluminum power transformer was on lisplay outside the Governor Clinton Hotel in New York City during the week of February 1st to 6th.

Moloney Electric Co., 6617 Clayton Rd., St. Louis, Mo., produced the transformer as part of a joint research and development project with Alcoa. The display of aluminum applications in the electrical industry, at which the power transformer was shown, was held at the same time as the mid-winter general meeting of the American Institute of Electrical Engineers.

Built to standard 3750 KVA transformer design specifications, the all-aluminum model has a thermal capacity far in excess of the design, due to advantages resulting from the use of finned aluminum tubes which, along with high heat transfer properties of the light metal, provide a theoretical thermal capacity of about 6000 KVA for the transformer. This is 60% better than the design, according to Alcoa.

The transformer will ultimately serve

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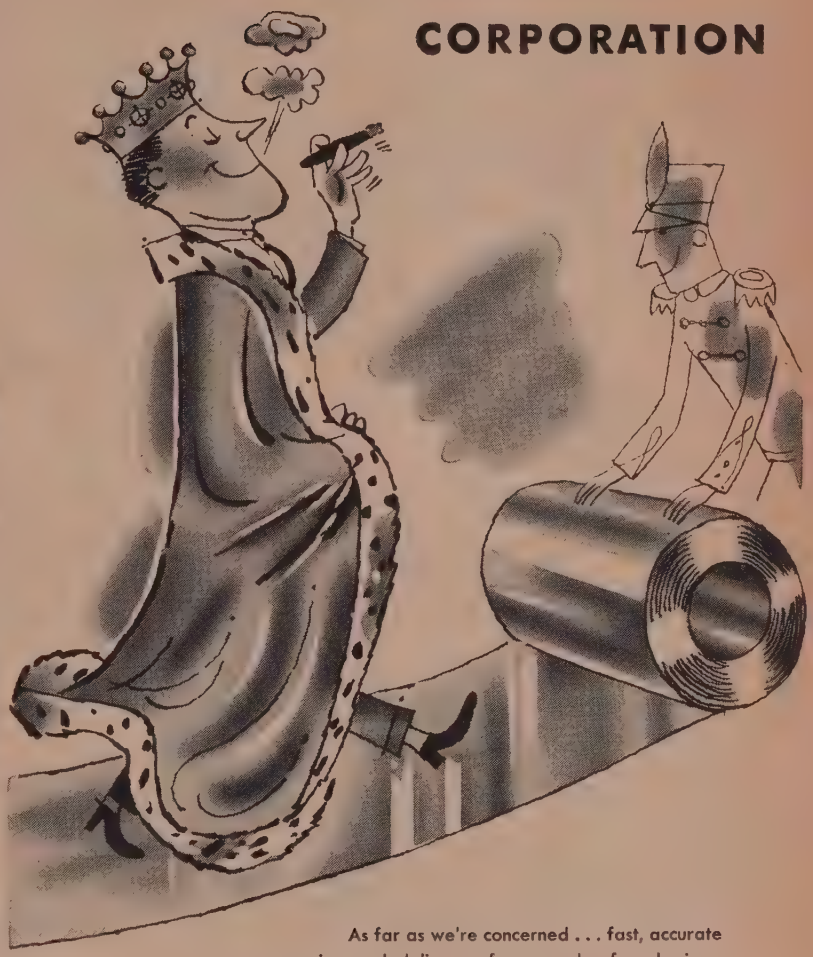

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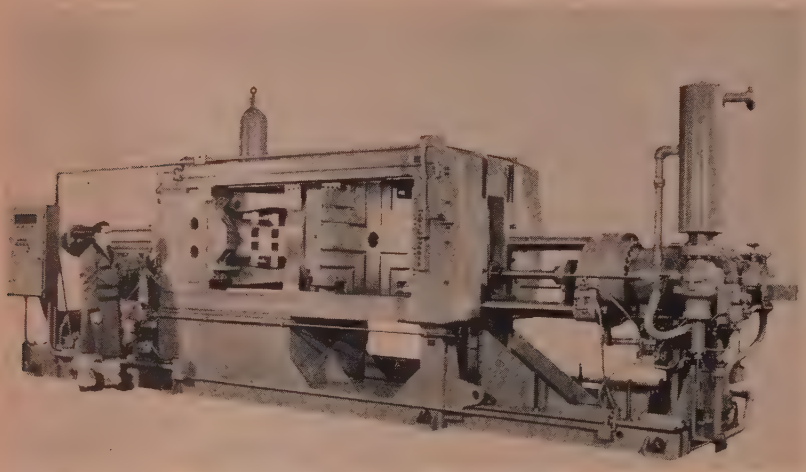
A SUBSIDIARY OF MUELLER BRASS CO

Alcoa's large hydraulic extrusion press at the Lafayette, Ind., works.

Aluminum is used for all metal parts except core and trucks. Alcoa feels that general use of aluminum in power transformers will be a step-by-step process with aluminum tubes for power transformer radiators the first development.



Big Die Casting Machine Joins Lester-Phoenix Line

A new 1000 ton aluminum die casting machine, designated the HP-3½X-40C-SF, designed to make 40-lb. castings of such parts as gas meter housings, motor blocks for outboard motors and street lighting housings, has been introduced by Lester-Phoenix, Inc., 2711 Church Ave., Cleveland 13, Ohio.

The machine incorporates the Lester pre-fill injection system, which, according to Lester, gives high initial speed with high final impact, to provide very dense die castings with fine surface finish.

The pre-fill system is used with a nitrogen accumulator with 11,000 cu. in. of capacity (at 2000 psi) for highest initial shot speed. Stroke of the injection plunger is 25 inches.

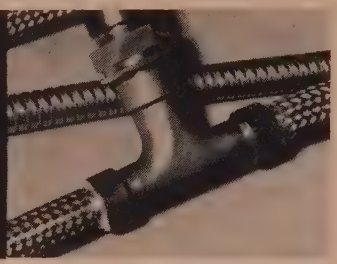
The injection shot end of the machine is adjustable from two inches to 12 inches below center. Support bars of the injection end are angled for easier metal pouring.

The 1000 tons of pre-load clamping is made possible by a one-piece alloy steel frame, with beam area equal to the full diameter of 9¼-inch tie bars. This frame also insures permanent, parallel alignment of the platens.

Die height is regulated by single hand crank which permits a maximum die height adjustment of 42 inches. Minimum die height is 39 inches, with a total daylight of 72 inches. Die opening is from 30 inches to 10¼ inches. The movable platen, completely unobstructed, is 60 inches wide, with vertical clearance between the beams of 60 inches. A 35 in. by 103 in. opening at the top of the frame makes the die space accessible from all sides.

The locking mechanism, an important feature in all Lester-Phoenix machines, is rigid single toggle and wedge giving 4-point lock with hardened cams and knuckles in the links to protect the toggle pins. Hardened steel bushings are used throughout. The hydraulic system allows die slowdown or cushion to protect the die faces and die speed control.

SOLDERING PROBLEM?
stainless to aluminum?
aluminum to copper?
cast iron to steel?



BOEING 707 Landing Gear Harness
Braided stainless steel wire and flexible conduit had to be joined to cast fittings. Brazing burned the fine wire. ALL-STATE had a special solder which solved the problem. (See #430, below.)

You get high strength with ALL-STATE special solders

#7 Special solder for cast iron 450-600°F. Withstands 1000 psi P.

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#430 NO LEAD, NO ZINC or CADMIUM — develops tensile strengths of 10,000 to 28,000 psi on stainless and dissimilar metals. For soldering iron at a low 430°F.

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New Device Warms, Cools Drum Contents

A device for heating or cooling conventional 55-gallon steel drums is being marketed by the Platecoil Division, Tranter Mfg., Inc., Lansing, Mich.

The drum warmer consists of a single-embossed Tranter "Platecoil" with quick-acting clamp and flexible connections to permit rapid change from one drum to another or changing the location on an individual drum. Insulated handles facilitate safe, easy handling of the drum warmer.

The flexible connections are connected to steam lines, hot or cold water

ome other refrigeration source to add withdraw heat from the contents of barrel.

he device may simplify storage prob- s of materials requiring a certain perature and ease processing sched- problems by quickly bringing mate- s to required temperature.

eneral Purpose Saw s Simple, Accurate

A new cut-off saw, capable of length curacy and cut parallelism within 03-in. with an unskilled operator is ow being marketed by Navan Products, nc., 900 N. Sepulveda, Los Angeles 45. avan is a North American Aviation bsidiary that markets inventions.

The new saw's spindle and vise are ntegral parts of the same casting. Spe- ial machining and checking methods ermit final alignment of cut to within 001 in. in all planes of the cutting peration. Long research of rpm and lade materials has resulted in a capa- ility to cut accurately most ferrous and onferrous metals, plastic and wood, with the use of only two different blades nd a fixed rpm, Navan reports.

Tests by Navan, which is marketing he new saw nationally, indicate that it will have wide acceptance by manufac- urers and machine shops as a general purpose tool for accurate cut-off work without holding up production runs on automatic machines. Price is said to be below $300.

Special Plate Developed For Jet Aircraft

High strength aluminum alloy 7079, widely used by the aircraft industry for extrusions and forgings is now being produced by Alcoa in 7079-T651 plate ranging in thickness from three to six inches. The new product, which is guaranteed to be within the ultrasonic testing acceptance limits for class A areas, determined by the Society for Non-Destructive Testing, has broadened light metal applications in the jet aircraft industry, according to Alcoa.

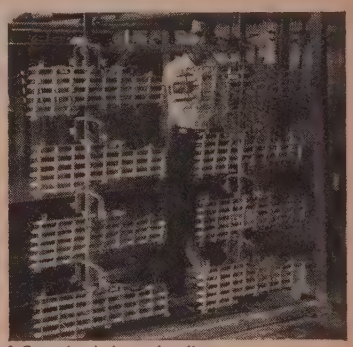
Suitable for machining into longer, wider aircraft parts than can be fashioned from large hand forgings, the plate should find extensive use for bulkhead assemblies and integrally stiffened wing panels. Alloy 7079-T651 maintains ductility in both the short and long transverse directions. Minimum mechanical properties are guaranteed in all three directions.

Alcoa developed a unique press-roll procedure to produce thick plate in alloy 7079. Ingots are worked on a huge press at the Cleveland works, then shipped to the company's Davenport, Iowa, plant for rolling, heat treatment and stretching. The method provides thick, homogeneous plate with a consistently sound internal structure, previously not possible in the alloy.

Door Closer Uses Unique Spring Design

The Airdraulic door closer, new product of Sterling Industries Inc., 4501 Perkins Ave., Cleveland, Ohio, is engineered for positive action on any kind of door —glass, screen, jalousie, etc.—with greater latching power.

Self-adjusting, the Airdraulic has an exclusive air-exchange design (patents



No brown fumes at Standard Products of Canada, Ltd., as leading automotive parts manufacturer bright dips and anodizes grilles.

ELIMINATE BROWN FUMES with new ALUMINUM BRIGHT DIP

New KENVERT® #46-A powder eliminates corrosive brown nitrogen oxide fumes from the bath and work in transfer. With this additive you will have a more stable bath, therefore consistent results. Solution control is easier. Savings result from less acid consumption, reduced expense for exhaust and ducting systems, and more efficient working conditions.

KENVERT #46-A ADVANTAGES

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- Less Sludging
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- Easy to Use Powder
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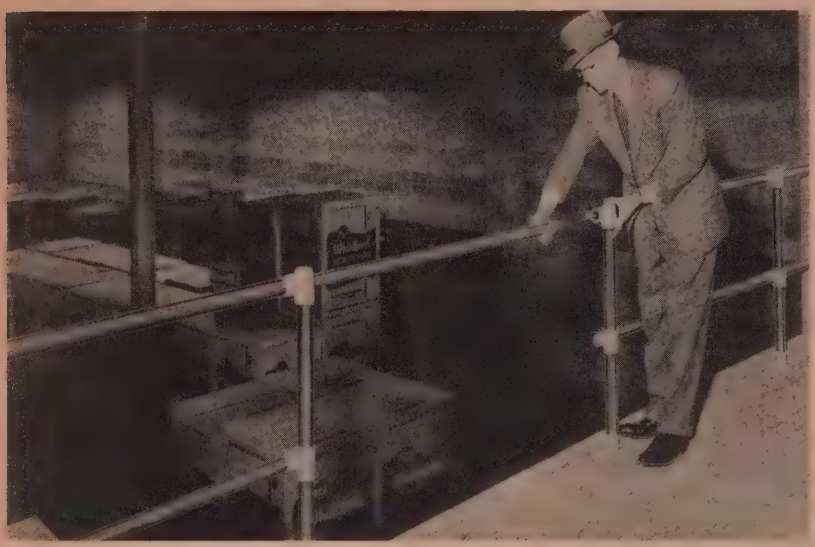
pending) eliminating need for constant adjustment. It is said to perform with the same smoothness as the most expensive hydraulic units without the use of any fluids, making use of a unique multi-spring design (patents pending).

The Airdraulic door closer is made of extruded aluminum. Overall length is 13¼ inches. Tube is 1½-in. diameter by 9¼ inches long.



Aluminum Railing Needs No Gate

Cast aluminum fittings which slip onto railing made from sections of aluminum pipe facilitate removal of railing for loading. They are expected to have increasing application in warehouses where safety precautions require a railing but space requirements do not permit a wide swinging gate.

A section of pipe railing with Nu-Rail slip-on fittings, made by Hollaender Mfg. Co., 3835 Spring Grove Ave., Cincinnati 23, Ohio, can be lifted out in two minutes by loosening two set screws with a small hex wrench in each of three fittings which are fastened to floor. P. R. Hollaender, president of the firm, is shown demonstrating the telescoping feature of the pipe. Lightness of the aluminum sections and fittings makes this a one-man job.

To construct the railing, pipe is cut to length, clipped into the Hollaender Nu-Rail fittings and fastened securely by recessed set screws using the wrench. Smaller diameter pipe is held closed by a thumb screw. Base fittings are fastened to floor by wood screws. This type of construction eliminates messy pipe threading and the sometimes dangerous welding of fixed railings.

Extend Line of Ejector Pins

Letter-size diameter ejector pins have been added to the standard line manufactured by Detroit Mold Engineering Co., 6686 E. McNichols Road, Detroit 12, Mich. Diameters can now be supplied in graduated steps from .0625 in. to .750 inch. The new pins are made in standard 10-inch lengths.

"All DME pins are heat-treated die steel, ground, nitrided and honed to a fine finish. The 70-80 Rc surface hardness reduces friction, keeping the pins from wearing holes in the cavities. Pin heads are solid forged and annealed for added strength and to prevent breakage under the most severe use."

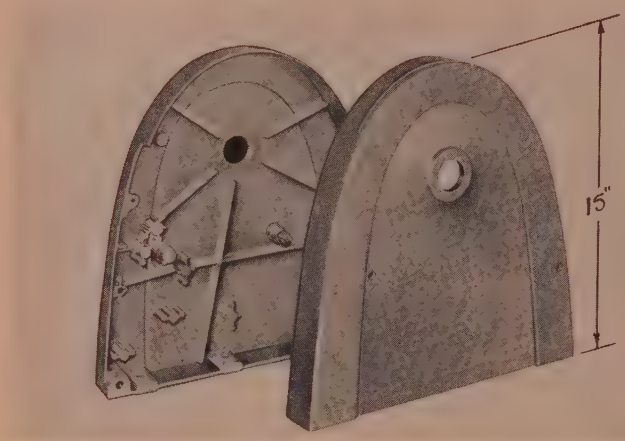
The company will produce stepped-diameter pins for special orders. If machine-tapered surfaces or contoured ends are necessary, blanks can be delivered in pre-nitrided condition ready for machining.

New Aluminum Clad Wire Has Many Advantages

Wire which consists of aluminum alloy cladding over a high conductivity copper core has applications both as magnet wire and as high temperature lead-in wire. Sylvania Electric Products Inc., 1740 Broadway, New York 19, developed the wire for use in the production of high temperature magnet wire and a variety of electrical conductor applications in aircraft, missiles, and other high speed industrial equipment.

The new wire features all the advantages of an aluminum surface plus conductivity approaching that of copper, according to R. E. Corcoran, product sales manager of Sylvania's Parts Division. Furthermore, aluminum surface can be anodized for insulation.

The aluminum alloy measures approximately 40% of the cross-sectional area. At room temperature the conductivity is close to 70% that of copper, Corcoran said.



WHY ALUMINUM DIE CASTINGS?

The concept of lightweight, durable and portable Mimeograph machines turned to aluminum die castings to solve major design problems.

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Liquid Aluminum Solidifies in Two Hours

A liquid aluminum material that can be cast without heat or pressure has been developed by Devcon Corp., Danvers, Mass. Devcon F-2, the liquid aluminum, is similar to the company's Devcon F, aluminum putty (80% aluminum, 20% plastic) but liquefies upon addition of the hardening agent. Two hours later it becomes a metallic mass.

The material is useful for making core boxes, patterns, matchplates, jigs, fixtures, vacuum forming dies, and other industrial tools. It has been used to fill large and small blow holes in castings, to fill holes drilled incorrectly and to build up worn sections.

Compression strength is 20,000 psi, and the material is unaffected by most oils, chemicals, and solvents. It bonds many materials to itself or each other including aluminum and ceramics. It is packaged in units of one, four and fifteen lbs., with hardening agent and release agent included.

Tested Aircraft Alloy Comes Onto the Market

An alloy designed especially for higher temperature applications ranging up to about 500° F. is being produced by Kaiser Aluminum, under a license with High Duty Alloys, Ltd., England.

Alloy 2618, originally developed for aircraft engine parts, has copper, magnesium, iron and nickel as principal alloying elements.

At room temperature, alloy 2618 in the T 61 temper has a typical ultimate tensile strength of 64,000 psi and a typical yield strength of 54,000 psi. After 10,000 hours at 300° F., it retains an U.T.S. of 50,000 psi and yield of 45,000. Typical properties after 10,000 hours at 400° F. are 33,000 psi U.T.S. and 30,000 yield. Thus, at temperatures over 300°. it is superior in properties to alloys 7075 and 2015.

Alloy 2618 is being produced in sheet, plate, extrusions, hand or die forgings and forging stock.

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- EQUIPMENT
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The ten industry groups and 71 product categories listed at the right IS the Light Metals Industry. This listing, plus the number of plants shown in the right-hand column, was compiled from the circulation files of Modern Metals. All of these plants get Modern Metals regularly and top-level men in those plants read it for the type of what's-ahead light metals information you'll find in this issue.

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Roofing, siding, shingles, etc.	120
Air conditioning, heating, ventilating	646
Fabricators, architectural & ornamental	2058
Fabricators, sheet metal	1130
Prefabricated buildings, mobile homes	241
Windows, doors, curtain walls, storefronts	1501
Hardware, weatherstrip, insul., fittings	657
CONSUMER DURABLE GOODS	**1981**
Appliances, small: Irons, mixers, etc.	160
Furniture: Outdoor, office, household	548
Houseware, giftware, gadgets	285
Lawn mowers, tillers, rakes, fencing	209
Refrig., freezers, washers, ranges, etc.	427
Toys & sporting goods	272
Utensils, all types	80
CONTAINERS & PACKAGING	**598**
Caps, closures, collapsible tubes	77
Foil converters: Cosmetic, food, beverage	79
Containers, all types	236
Shipping & luggage	26
Spools & reels	22
Drums, barrels, receptacles	40
Tanks, all types	83
Containers, household	35
ELECTRICAL INDUSTRY	**2019**
Communications: Radio, TV, phone	469
Electronics: Equipment & parts	570
Electrical equipment, heavy	106
Electrical equipment, light	87
Fixtures & fittings, incl. lighting	429
Motors, heavy & light	160
Wire & cable	198
MACH. & EQUIP. (NON-ELECT.)	**2634**
Industrial, general purpose	515
Engines	181
Mining & construction	80
Compressors, pumps, blowers, valves	449
Agricultural & dairy	388
Ladders & scaffolds	137
Materials handling	350
Office & store	224
Tools, portable & hand	310
SCIENTIFIC & TECHNICAL EQUIP.	**954**
Measuring & controlling	286
Aircraft, navigation, vehicle	241
Laboratory & professional	123
Safety equipment	94
Orthopedic & medical appliances	90
Photographic & optical	120
TRANSPORTATION & PARTS	**1920**
Aircraft, military & commercial	458
Hardware, aircraft & vehicle	118
Highway signs, bridge rails, light poles	44
Automobiles, buses, trucks	658
Trailers & truck trailers	294
Marine: Ships, boats, etc.	208
Railroad	71
Bicycles, scooters, carts, etc.	69
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Air Force	10
Navy	12
Atomic energy & advanced weapons	56
LIGHT METALS PROCESSORS	**7014**
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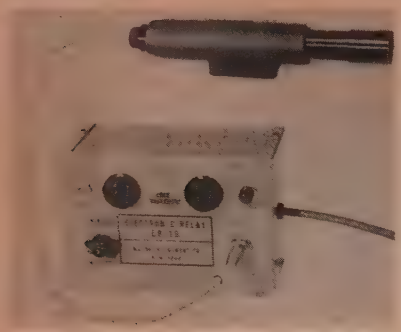
Foundries, sand & permanent mold	2137
Extruders & tube producers	247
Fabricators: Draw., form., stamp'g	2394
Finishers: Anodizing, plating, etc.	293
Forging, impact extruding plants	78
Fastener mfrs.: Screw machine shops	668
Reduction plants & smelters	97
Sheet, plate, foil mills	50
MISCELLANEOUS INDUSTRIES	**1137**
Chemical & metallurgical	127
Manufacturing, special & misc.	446
Signs, nameplates, displays, frames	320
Metal specialty manufacturers	244
U.S. TOTAL	25,339

Remote Control Maintains Billet Heater Temperature



A new radiation pyrometer-controller manufactured by Mason Instrument Co., 29 Elm Ave., Mount Vernon, N. Y., helps maintain consistent billet temperature control prior to extrusion. Called the Pyrotrol, it is an optical, non-contacting temperature-sensing device, capable of operating many feet away from the billet.

An optical-electronic device scans a hot object or target emitting radiation of various wave lengths. Only the near infra-red part of the spectrum is sensed by the Pyrotrol because of the use of filters. This is focused upon a photocell whose output signal is electronically amplified, triggering the electronic relay, thus signalling or controlling.

The PY10 standard model has a temperature range of 950° to 2000° F. PY10L with special detector has a temperature range of 650°-1500° F.; PY10XL with special detector and optical system, 500°-1200° F.; PY20 with special detector, optical system and high gain amplifier, 250°-700° F.

Upper range of temperature is raised by attaching Lens Cap LC10. An attachable lens shade slips on front of instrument for very bright surroundings or for very small targets.

Financial Briefs

Canadian British Aluminium Reports Loss in First Year

At the end of its first year of operation, Canadian British Aluminium Co. reported a net loss of $1,914,229. Gross income was $1,087,851, but this included $273,750 returned by investments. The firm's aluminum reduction plant at Baie Comeau operated at partial capacity through last year, but is now running at its full rated capacity of 90,000 tons annually. It employs about 800.

Canadian British Aluminium is owned by British Aluminium and Quebec North Shore Paper Co. Controlling interest in the parent British company was acquired by Tube Investments Ltd. and Reynolds Metals Co. early this year.

United Pacific Aluminum Now Listed on American Exchange

The common shares of United Pacific Aluminum Corp., Los Angeles, are listed on the American Stock Exchange, effective March 17. Ticker symbol for the firm is UPL. United Pacific, a producer of aluminum sheet and coil since the end of World War II, is a big supplier of aluminum to building material manufacturers. For the first half of the fiscal year ended September 30, 1958, net income amounted to $180,698 (52 cents per share) as compared with $121,365 (35 cents per share) earned for the entire fiscal year ended March 31, 1958. Sales in this six-month period were $3,026,930.

Ormet Start-Up Costs Slash Revere Earnings

Revere Copper & Brass Inc.'s net income for 1958 totaled $2,481,655, or 94 cents per common share on the 2,627,306 shares outstanding. Charged against '58 earnings was the non-recurring loss of $10,395,942 before taxes on aluminum purchased from Ormet, the primary aluminum project jointly owned by Revere and Olin Mathieson Chemical Corp. Eliminating this charge, Revere pointed out that last year's income would have equalled $2.84 a share, as compared with earnings of $3.24 per share for 1957 on the 2,618,306 shares outstanding as of December 31, 1957.

Sales in '58 totaled $181,731,689, compared with $199,625,549 in 1957. This 9% decrease was attributed to lower shipments of copper and brass products, to lower prices of raw copper as reflected in Revere's selling prices, and to reduced shipments to the automotive industry. Revere's sales of aluminum mill products, utensils, and other fabricated products increased moderately in '58 over the preceding year.

"During 1958, while Ormet's facilities were progressively being brought into production, the cost for Ormet's aluminum output was substantially in excess of market price," Revere said. "The 1959 costs of Ormet aluminum are forecast as less than present market price of 24.7 cents per pound."

Kawneer Reports Dip in Net; Girds for Future Progress

Despite reduced sales and earnings last year, management of Kawneer Co., Niles, Mich., feels that 1958 was a year during which it faced many problems and succeeded in laying the foundation for future progress. The firm netted $979,141 from sales of $27,885,782 last year, compared with profits of $1,256,912 and sales of $33,181,491 in '57. Net earnings per share in '58 were $1.10

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- 6063-T5 6061-T6 2024-T4 7075-T6 Extruded Aluminum Shapes
- Extruded Tubes — Round, Rectangular, Square

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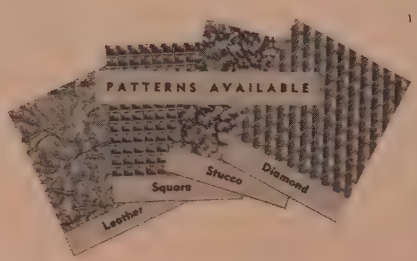

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ompared with earnings of $1.41 per hare in '58.

Kawneer reported completion of many facility changes which were accomplished for the purpose of increased efficiency and reduced costs. Now the firm feels that "the favorable business trend of the last half of 1958 will continue through '59."

Mueller Brass Reports Gain

A 10% increase in sales in its first fiscal quarter ended February 28 was reported by Mueller Brass Co., Port Huron, Mich., over the same period of 1958. Sales were reckoned at close to $13 million, compared with $11,797,933 in the like period in '58. Profits in the first quarter last year were $274,401, or 49 cents a share. Last year, Mueller earned $1.5 million, or $2.68 a share, on sales of $53,385,983.

Men-on-the-move

Robert J. Ogden has been appointed manager of screw machine stock sales for Aluminum Co. of America. He will coordinate the company's expanding sales and service policies with screw machine stock customers.

Permanent Mold Die Co., Inc., Hazel Park, Mich., has appointed **Frank Ross** chief engineer. Ross had been vice president in charge of engineering for Centrocast & Engineering Co., Detroit, and chief engineer for the Aluminum Alloy Corp., Detroit.

Daniel H. Sangster has been named manager of the newly created eastern district office of Revere Copper & Brass Inc.'s Foil Container Division. The move follows the opening by Revere of a new foil container plant in Fort Calhoun, Neb. Before joining the company three years ago, Sangster worked in the advertising, publishing and packaging fields.

Fairmont Aluminum Co., Fairmont, W. Va., has appointed **Max E. Moran** to the post of assistant sales manager. He leaves the New York district managership to be filled by **George F. Donahue.** Donahue has been active in the nonferrous metals and allied fields for the past 15 years.

Fairmont, a producer of aluminum sheet, coil and circles, also appointed **Robert P. Maloney** to the post of Pittsburgh district sales manager. He will serve Fairmont's customers in the western two-thirds of Pennsylvania. Maloney has served in nonferrous metals sales capacities for the past 11 years.

General Extrusions, Inc., Youngstown, Ohio, has named **Anthony A. DeLuca** as its Pittsburgh area sales representative.

Aluminium Ltd., Swiss Can Maker Join Forces

Europe's leading manufacturer of aluminum cans and Aluminium Limited of Canada have merged their common interests in the aluminum can market.

In the new association, Aluminium Ltd. will acquire one third of the shares of Fabrique d'Emballages Metalliques SA Fribourg, Switzerland, through a 50% increase in FEM's capital. Purpose of the association is to share knowledge and experience of aluminum can making and jointly promote the greater use of the aluminum can. Techniques developed will be used in this effort.

Fabrique d'Emballages operates can making facilities in Switzerland, France and Holland. Its sole business is the aluminum can.

Aluminium Ltd.'s associate companies in Norway, Germany and Denmark recently complemented FEM's efforts by developing markets for aluminum cans in these areas. Aluminium Laboratories, Ltd. has conducted a ten-year research program on the manufacture, filling and use of aluminum cans.

Precision Saw With Air Clamps Makes Clean Cuts..Reduces Waste & Machining

FOR

Stainless
Aluminum
Magnesium
Copper
Glass

Rough edges left from shearing and inaccurate saws pile up needless machining bills . . . plus the cost of wasted metal. With this new Ty-Sa-Man 144-BD Saw, adjustable air clamps hold metal down while the saw travels down the machined transverse rail, delivering cuts with smooth edges to amazing tolerances. Cut parallel strips . . . handle difficult jig fixture work with this self-contained saw which has its own integral cooling system and tank. Among its features are a calibrated guide fence, infinite variable speed from zero to twenty FPM, push-button control and 15 HP motor.

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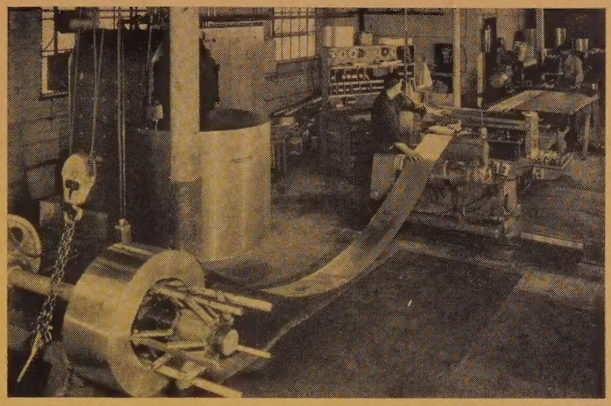

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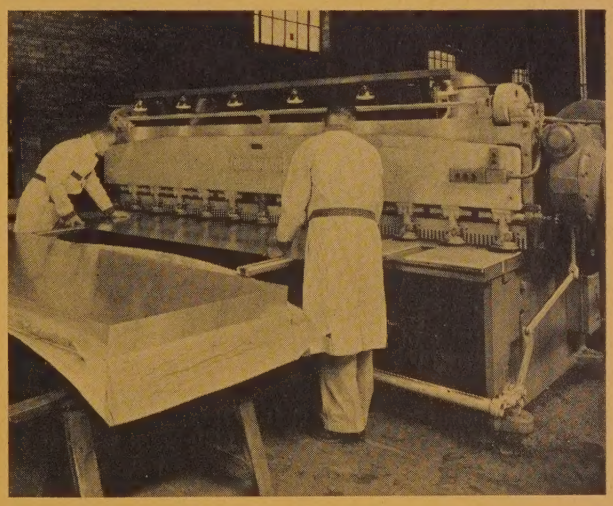

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Looking Ahead

The spring spurt in auto sales was one of the most bullish factors in the economy as the year's second quarter began. Auto makers delivered 1.3 million cars in the first quarter — a hefty 24% gain over deliveries in the first three months of '58. The industry's production plans call for 577,400 cars in April, according to *Ward's Automotive Reports*. That would exceed last year's dismal April level by more than 80%. Result: Second quarter sales could approach the 1.7 million mark reminiscent of the 1956-57 model years.

Some overly optimistic industry observers are talking up the possibility of a 6 million car year. That looks unlikely at this time — unless you also count imports — but chances of a 5.5 million car year cannot be discounted. In any event, the Detroit resurgence adds up to better business for die casters, for smelters who sell them ingot, and for all types of parts suppliers. If the auto makers sell 5.5 million units, the industry's aluminum consumption should hit a new high of over 141,000 tons.

Other major consuming industries are moving along at least as well as the auto industry. Take building and construction — aluminum's biggest market. Total construction volume this year should top $52 billion — 7% higher than last year's level, and 3% over the record set in 1955. Sparking the upsurge are housing (starts are moving at a rate of 1.3 million annually) and highways, which should hit $6 billion this year. Industrial and commercial building are also on the rise.

The electrical industry's volume is approaching boom proportions, spurred by strong retail sales of TV sets and stereophonic and hi-fi equipment. All of these consumer durables use respectable quantities of aluminum. Some industry sources forecast TV set sales at up to 5.8 million units this year. Zenith is contemplating another expansion of its capacity; R.C.A. is presently expanding its facilities; Whirlpool has beefed up its work force; and Westinghouse reports an upturn in orders for heavy electrical equipment. The electronics industry is reported to be operating at 90% of capacity.

Sales of appliances are also on the rise. The Gas Appliance Manufacturers Association has raised its forecast of the industry's gain this year. "Events of the first quarter make it reasonable to assume that combined shipments of household, commercial and industrial gas equipment will top the 1958 total by nearly 15%, instead of 9% predicted last December," an association spokesman said. The rosier outlook is attributed primarily to the rise in housing starts.

Power mower sales seem certain to register a fairly good gain over last year. This $200 million-a-year business suffered its first setback last year when sales dropped about 10% below the 1957 rate. But with their big selling season all but over, the major members of the industry are confidently predicting a return to the happier pre-1958 days. An executive of Lawn Boy Division of Outboard Marine, for example, reported an 18% gain in distributor orders compared with 1958. Lawn Boy, like most other power mower makers, uses substantial quantities of aluminum.

Aircraft industry's troubles continue, as missiles replace planes in the nation's defense setup. Pentagon's funds for aircraft will probably drop to $6.8 billion in fiscal 1960, compared with $7.3 billion in the current fiscal year. Outlays for missiles are expected to drop to $3.8 billion from $4.1 billion as some missile systems are dropped. Orders for commercial jets and turbo-props will help, but the industry is still plagued with over-capacity. One major firm — Lockheed — is looking at submarines as a possible replacement for aircraft. It's considering design of small, 15-man, missile-firing submarines made of high strength aluminum plate.

Sales of nearly all types of aluminum are still moving along at a brisk clip. "Our order load and aluminum shipments have increased month after month since last September," reported an Alcoa spokesman last month. "The curve has turned up more steeply recently — but not dramatically, the way it would if buyers were hedging against a strike." Reynolds Metals reported shipments of almost all types of mill products at near the record levels of 1956. First quarter shipments of mill products showed gains of anywhere from 7% to 15% over the previous quarter.

Prospects of a strike could have a potent impact on aluminum sales in the next few months, however. The three-year labor contracts of all three of the major producers expire on July 1st. Steel contracts run out a month earlier. In the past, the steel industry's settlement has set the pattern for aluminum. If a walkout hits the ferrous industry, the aluminum producers might follow suit in resisting the unions' wage demands. Unless the unions backed down, a strike could ensue. If wage hikes are granted, the producers may well boost prices.

Producers could even raise prices before their union contracts expire — though it seems unlikely at this time. Last December, the producers promised that prices would not be raised on any orders shipped before July 1st. There has been speculation that hedge buying in advance of this deadline could boost aluminum sales substantially in the next several weeks. The producers have not indicated what will happen following the price-freeze expiration, but there seems little likelihood that they would raise prices immediately before wage negotiations. And overhanging the entire question of prices is the problem of low-priced imports — particularly mill products. Whether prices would be raised in the face of foreign competition is certainly a debatable point.

— The Editors

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